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Witnesses: Eric Borden and Courtney Lane

PREPARED TESTIMONY OF

ERIC BORDEN AND COURTNEY LANE

ADDRESSING QUANTITATIVE RISK ANALYSIS ISSUES IN SEMPRA'S 2024 TEST YEAR GENERAL RATE CASE

Submitted on Behalf of

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I. INTRODUCTION

Q. Please state your name, title, and employer.

A. Mr. Borden: My name is Eric Borden. I am a Principal Associate at Synapse Energy Economics ("Synapse"), located at 485 Massachusetts Avenue, Suite 3, Cambridge, MA 02139.

Ms. Lane: My name is Courtney Lane. I am a Principal Associate at Synapse, located at 485 Massachusetts Avenue, Suite 3, Cambridge, MA 02139.

Q. Please describe Synapse.

A. Synapse is a research and consulting firm specializing in electricity and gas industry regulation, planning, and analysis. Our work covers a range of issues, including economic and technical assessments of demand-side and supply-side energy resources; energy efficiency policies and programs; integrated resource planning; electricity market modeling and assessment; renewable resource technologies and policies; and climate change strategies. Synapse works for a wide range of clients, including state attorneys general, offices of consumer advocates, trade associations, public utility commissions, environmental advocates, the U.S. Environmental Protection Agency, U.S. Department of Energy ("DOE"), U.S. Department of Justice, the Federal Trade Commission, and the National Association of Regulatory Utility Commissioners. Synapse has over 30 professional staff with extensive experience in the electricity industry.

Q. Please summarize your professional and educational experience.

A. **Mr. Borden**: I have over 10 years of experience in the energy industry and joined Synapse in 2022. From 2015 to 2022, I was a Senior Energy Expert at the Utility Reform

Network ("TURN") in California, where I served as an expert witness in numerous proceedings before the California Public Utilities Commission. I provided in-depth analysis to inform policy recommendations on a variety of energy issues, including several applications and policy-related proceedings related to electric vehicle infrastructure and policy. Prior to my role at TURN, I served as a Senior Energy Analyst at 4Thought Energy, where I conducted financial analyses based on multiple utility tariffs for a distributed generation natural gas combined heat and power firm. I also have previous consulting experience. I have a Bachelor's degree in finance from Washington University in St. Louis and a Master's in Public Affairs from the University of Texas at Austin. My resume is attached as Appendix A.

Ms. Lane: I have 18 years of experience in energy policy and regulation. At Synapse, I work on issues related to performance-based regulation, grid modernization, benefit-cost analysis, rate and bill impacts, and review of distributed energy resource and electric vehicle utility filings. Prior to working at Synapse, I was employed by National Grid as the Growth Management Lead for New England where I oversaw the development of customer products, services, and business models for Massachusetts and Rhode Island. In previous roles at National Grid, I led the development of Rhode Island Annual and Three-Year Energy Efficiency Plans, led the facilitation of the Rhode Island Energy Efficiency Collaborative, and worked with key stakeholders on the development of policies and strategies to further promote energy efficiency and demand response in the state. Prior to joining National Grid, I worked on regulatory and state policy issues pertaining to energy conservation, retail competition, net metering, and the Alternative Energy Portfolio Standard for Citizens for Pennsylvania's Future. Prior to that, I worked

for Northeast Energy Efficiency Partnerships, Inc. where I promoted energy efficiency throughout the Northeast.

I have testified before the New Hampshire Public Utilities Commission, the Maryland Public Service Commission, the New Mexico Public Regulation Commission, the Pennsylvania Public Service Commission, the Public Service Commission of the District of Columbia, and the Rhode Island Public Utilities Commission.

I hold a Master of Arts in Environmental Policy and Planning from Tufts University and a Bachelor of Arts in Environmental Geography from Colgate University. My resume is attached as Appendix B.

Q. On whose behalf are you testifying in this case?

A. We are testifying on behalf of The Utility Reform Network (TURN).

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to review and assess the risk modeling approach – particularly the approach for calculating Risk Spend Efficiency (RSE) values -- presented by San Diego Gas & Electric Company (SDG&E) and Southern California Gas Company (SoCalGas) (collectively, Sempra or the Companies) in its Test Year 2024 General Rate Case (GRC) Application. The methodology to be used is prescribed by the settlement adopted in D.18-12-014, to which the Sempra Utilities were signatories.

In addition, our testimony presents the RSE results provided by the Sempra Utilities, as well as alternative calculations that address some of the flaws in the Companies' methodology that we discuss in this testimony.

Q. Why is RSE analysis important?

A. RSE analysis contributes to the Commission's decision-making process by providing an important tool for measuring and comparing the cost-effectiveness of the programs proposed in this case. As the Commission has stated, "RSE calculations are critical for determining whether utilities are effectively allocating resources to initiatives that provide the greatest risk reduction benefits per dollar spent, thus ensuring responsible use of ratepayer funds."[1] RSEs provide a measure of the relative cost-effectiveness of the proposed risk reduction programs and thus help to prioritize funding for risk reduction initiatives within the constraint of affordable rates. In addition, as we discuss in Section V, RSEs can be easily expressed as Benefit-Cost (B-C) ratios in dollar terms, which provide another, stand-alone, measure of the cost effectiveness of proposed risk reduction programs and, thus, another tool for the Commission to weed out inefficient spending.[2]

Q. What testimony and submissions from the Companies did you review in preparing this testimony?

A. Our testimony is primarily based on the Companies' testimony and workpapers in this case, as well as a review of the Companies' 2021 Risk Assessment Mitigation Phase (RAMP) Reports, which contain details of the underlying methodological choices and calculations of the RSE values. Our understanding is that the 2021 RAMP methodology for RSE calculation has not changed except for the following: removal of the Stakeholder Satisfaction attribute, use of a Generalized Pareto Distribution for SDG&E's wildfire risk assessment, adoption of 31 additional levels of tranche granularity, and recalibration of

[1] Decision (D.) 21-08-036, p. 38.

[2] We note that the tables in this testimony do not consider changes to RSE inputs or methodology outside of those discussed herein, such as those recommended by witness Borden, Exhibit TURN-13, specific to wildfire mitigation RSE calculations.

the baseline year to the end of 2023 and historical data for the purpose of RSE calculations, to align with the 2024 test year (TY).[3]

Q. To the extent that you are pointing out flaws in the Companies' RSE methodology, are you testifying that Sempra's RSE calculations are of no use for the Commission's decision-making purposes?

A. No. As discussed, we make recommendations to increase the accuracy of Sempra's RSE calculations and recommend that the Commission rely on our alternative calculations of RSEs and B-C ratios. The Commission should be aware of the impacts our recommended changes make on these results as it applies RSE analysis to funding decisions. To the extent our recommended changes have a material impact on results that are being compared, we recommend that the Commission be particularly attentive to the impact of our corrective changes.

However, even if the Commission does not adopt our recommendations to adjust the Companies' RSE methodology, it should still take account of the results from Sempra's methodology for decision-making purposes. Even Sempra's flawed calculations generally provide important information to inform the Commission's funding decisions.[4] And when, as we explain in Section IV below, Sempra's RSEs are converted to B-C ratios in dollar terms, the Commission will have additional useful information for decision-making. Therefore, we recommend that the Commission utilize the risk modeling and RSE results as a valid means to examine cost-effectiveness across

[3] Ex. SCF-03-2R/SDG&E-03-2R, Chap. 2, Second Revised Prepared Direct Testimony of Gregory S. Flores and R. Scott Pearson, pp. RSP/GSF-8 to RSP/GSF-11.

[4] However, to the extent the Commission relies on Sempra's RSE results, the Commission should also take into account the insufficient granularity of Sempra's tranches for certain risks, as discussed in Section V below.

mitigations and risk areas, regardless of whether the Commission relies on the more accurate methodology recommended herein.

Summary of Conclusions and Recommendations

Q. Please summarize your primary findings regarding Sempra's RSE methodology.

A. We identify and discuss three flaws in the Companies' RSE calculation methodology:

1. Risk reduction and costs are not uniformly discounted.
2. Sempra does not correctly estimate or discount costs.
3. The 3 percent discount rate selected by Sempra to discount risk reduction is insufficiently supported.

We also discuss how to represent RSEs in dollar terms to compare absolute costs with benefits (i.e., B-C ratios) in Section IV. This allows stakeholders to easily see whether a mitigation's benefits are expected to be greater than costs, namely if the ratio calculated is greater than 1.0.

Q. Please summarize your recommendations.

A. RSEs should be calculated in a manner that appropriately discounts future benefits and costs to a baseline year that is most relevant to the analysis, which, here, is the 2024 test year. Additionally, the discount rate should be sufficiently supported and relevant to the analysis. We find the Companies should:

1. Discount costs at the weighted average cost of capital (WACC) to 2024 (test year) dollars.

2. Discount risk reduction benefits at the same discount rate, WACC, to 2024.

We also explain that a more accurate RSE calculation would incorporate an estimation of revenue requirement, rather than direct costs, to incorporate into the denominator of the RSE calculation. While we lack the data to correct this flaw in this GRC, the Commission should be aware that, because of this issue, RSEs for capital programs are overstated.

We recommend the Commission rely on our re-calculated RSE values and B-C ratios, presented in the Appendix, in addition to any other recommendations adopted by the Commission.[5] However, as noted above, even if the Commission does not adopt our recommendations, it should still use the results of Sempra's methodology, including the B-C ratios derived from Sempra's results, as a useful, albeit less accurate, decision-making tool.[6]

Q. Please explain how the remainder of your testimony is structured.

A. Section II discusses the primary flaws in Sempra's RSE methodology, summarized above. Section III explains the modifications we recommend to correct those flaws. Section IV discusses how to mathematically express RSEs as a B-C ratio in dollar terms, which converts risk reduction benefits to costs to allow for a simple way to see if benefits exceed costs (*i.e.,* when the ratio is greater than one). Section V provides a roadmap of

[5] For example, witness Borden provides additional recommendations specific to the calculation of wildfire risk in Ex.TURN-13.

[6] As discussed in Section V below, before concluding that any program or tranche is cost-effective, the Commission should take into account the insufficient granularity of Sempra's tranches for certain risks, an issue which affects both Sempra's and TURN's calculations.

the RSE and B-C ratio results that we present in Appendix D to this testimony, calculated under Sempra's methodology and our alternative methodology.

II. PRIMARY FLAWS IN SEMPRA'S RISK SPEND EFFICIENCY METHODOLOGY

Q. In general, please describe how Risk Spend Efficiency (RSE) is calculated.

A. Under the D.18-12-014 Settlement, RSE is calculated by dividing the expected risk reduction benefit from the mitigation (pre-mitigation risk minus post-mitigation risk - the numerator) by the costs of the mitigation (the denominator).[7] The Settlement requires that "[t]he values in the numerator and denominator should be present values to ensure the use of comparable measurements of benefits and costs."[8] This is accomplished for each program and separately for each risk tranche of each risk area.[9]

$$\boldsymbol{RSE} = \frac{(\boldsymbol{Pre{-}mitigation\ Risk{-}Post{-}Mitigation\ Risk})}{\boldsymbol{Cost}}$$

Q. What is the Companies' methodology for discounting risk reduction and costs in its RSE calculation?

A. For the *costs*, the Companies calculate 2021 constant dollars (direct costs) and do not apply any further discount rate.[10] Risk reduction *benefits* are discounted to TY 2024 at three percent, based on what Sempra describes as a societal discount rate.

[7] D.18-12-014 at Attachment A, p. A-13 (Row 25) (RSE should be calculated by dividing the mitigation risk reduction benefit by the mitigation cost estimate.")

[8] *Id.*, p. A-13 (Row 25).

[9] *Id.*, p. A-11 (Row 14) (". . . risk spend efficiencies will be determined at the Tranche level . . .").

[10] Sempra RAMP Report, A.21-05-011 (2021 RAMP), p. RAMP-C-33.

Q. Do the Companies' RSE calculations adhere to the D.18-12-014 requirement that the numerator and denominator be present values "to ensure the use of comparable measurements of benefits and costs."?

A. No. There are three issues. First, the Companies apply different discount rates to the numerator and denominator, leading to non-comparable measurements of benefits and costs. Second, Sempra does not accurately estimate or discount costs. And third, the Companies use an unsupported discount rate to discount risk reduction benefits.

1. Risk Reduction and Costs in the RSE Calculation are Not Uniformly Discounted

Q. How do the Companies apply discount rates in their TY RSE calculation?

A. The Companies apply a 3 percent discount rate in the numerator, while costs in the TY denominator are deflated to 2021 constant dollars, and otherwise not discounted. It is inaccurate for RSE analysis – or indeed *any* type of benefit-cost analysis -- to use different discount rates in the numerator and denominator, even if the units are different.

Q. Please explain why it is important that the same discount rate be applied to both risk reduction benefits and costs to ensure comparable values.

A. If the discount rate to calculate the present value of the mitigation risk reduction benefits is different than the discount rate for its associated costs, it will result in asymmetrical weighting of the benefits and costs for the same investment, leading to inaccurate RSE values.

As noted by the U.S. Environmental Protection Agency "[I]t is important that the same discount rate be used for both benefits and costs because nearly any policy can be justified by choosing a sufficiently low discount rate for benefits, by choosing

sufficiently high discount rates for costs, or by choosing a sufficiently long time horizon."[11]

To provide for an accurate calculation, it is important that the same discount rate be applied to mitigation risk reduction benefits and costs to ensure the numerator (risk reduction) and denominator (cost) are directly comparable, per row 25 of the Settlement. As made clear by the Settlement language, if the values in the numerator and denominator of the calculation are not directly comparable, it is not correct to divide them in the RSE calculation.[12]

2. Sempra does not correctly estimate and discount costs.

a. Sempra uses an incorrect baseline year for its cost calculations

Q. Please explain how the Companies' discount costs in their RSE calculation.

A. For its TY RSE calculations, Sempra inputs direct costs for its programs in constant 2021 dollars. Sempra's post-test year (PTY) calculations utilize nominal dollars. Not only are the two approaches internally inconsistent, the TY calculation utilizes a beginning year that is irrelevant to this calculation.

Q. What is the calculation methodology that should have been employed by Sempra to calculate the present value of costs?

A. For TY calculations, Sempra should have used 2024 nominal dollars without additional discounting, not 2021 dollars, for each risk mitigation program proposed for the TY,

[11] U.S. Environmental Protection Agency (US EPA). *Guidelines for Preparing Economic Analyses*. December 2010, pg. 6-2. Available at: https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses.
[12] D.18-12-014 at Attachment A, A-13 (Step 3 – Row 25).

because 2024 represents the first year that costs will be incurred and benefits accrue. Sempra's use of 2021 dollars is a remnant of its RAMP approach in which it treated 2021 as the baseline year for its RSE analysis. However, at the conclusion of the RAMP, the Commission directed Sempra to use the end of 2023, effectively the beginning of 2024, as the baseline for its RSE calculations.[13] Thus, 2021 costs are simply not relevant to the RSEs calculated for this case, because Sempra is required to use the beginning of 2024 as the baseline for the RSE analysis.

For PTY calculations, Sempra should have either deflated each year's costs to 2024 dollars to account for inflation and then used a real discount rate to calculate present value, or discounted costs at the Companies' weighted average cost of capital (WACC) (which is a nominal rate) without adjusting the nominal dollars used in the calculation. The latter would be a simpler method.

Q. Why is WACC the appropriate discount rate to discount utility costs?

A. The choice of discount rate should reflect the time value of money, which for investor-owned utilities is the WACC. The Companies' proposed risk mitigation investments are traditional utility investments and the WACC most closely aligns with the time preference of money for investor-owned utilities.

The purpose of the original rulemaking in R-13-11-006 was to "incorporate a risk-based decision-making framework into the Rate Case Plan (RCP) for the energy utilities'

[13] A.21-05-011, Assigned Commissioner's Ruling Directing Sempra Utilities to Incorporate Staff Recommendations on Their Risk Assessment and Mitigation Phase in the Upcoming 2024 General Rate Case Applications, p.3, subpart (a). The Ruling states that 2023 should be the baseline year, but it is clear from the context of the SPD Staff Report in the RAMP and the TURN recommendation that SPD endorsed that "2023" means the end of 2023.

GRCs."[14] Within GRC proceedings, the Commission "reviews and authorizes the revenue requirement necessary for the utility to recover the reasonable capital investment costs and annual expenses necessary to operate and maintain its facilities and equipment, in a safe and reliable manner."[15] The mitigations for which Sempra calculates RSEs, such as undergrounding, vegetation management, pole and transformer replacement, pipeline replacement and pipeline leak repair, are common types of utility investments that have been proposed, in one form or another, for decades. These investments primarily support the obligation of investor-owned utilities to provide safe, reliable and affordable service to their customers. From the Companies' perspective, WACC represents the time value of money for investors. From a financial perspective, WACC is a valid estimate of the return on equity and debt expected by the utility every year. A present value calculation adjusts future costs for the time value of money, and WACC serves as a reasonable proxy to accomplish this.

We also note that TURN's recommendation to use the WACC for discounting incremental mitigation costs in Southern California Edison Company's (SCE) 2022 RAMP Application was supported by the Commission's Safety Policy Division Staff (SPD). In its Evaluation Report on SCE's 2022 RAMP Application, SPD stated that "[b]ecause SCE "finances its operations with a mix of debt and equity issuances," the reasonable incremental cost of capital SCE should use to discount incremental costs

[14] Decision 18-12-014, pg. 3.
[15] Decision 20-01-002, pg. 4.

should be SCE's Weighted Average Cost of Capital (WACC), which is currently 7.68%."[16]

Q. What is Sempra's rationale for deflating costs to 2021 constant dollars for the TY RSE calculation?

A. Sempra asserts that its methodology follows the Rate Case Plan, which prescribes that costs be presented in base year dollars in GRCs. Sempra also states,

> "[f]urther discounting costs to today or "present value" is not needed because GRC forecasts are already in today's 2021 constant dollars. This is consistent with the RAMP proceeding, which used 2020 recorded costs. SoCalGas and SDG&E believe that the "comparable measurements" and "present values" language in the Settlement Decision is consistent with the Rate Case Plan's requirement to present all costs in base year, constant dollars."[17]

Q. Is this argument sound?

A. No. In fact, the Rate Case Plan has no bearing on RSE calculations. Putting aside that "today's" dollars are not 2021 (Sempra's rate case was filed in the middle of 2022), adjusting costs to 2021 dollars is inappropriate because both benefits (risk reduction) and costs of the programs being evaluated begin to accrue in 2024, the test year of this GRC. As Sempra's RSE calculation is currently constituted, benefits are discounted to 2024 while costs are deflated to 2021, which is inappropriate. This means the numerator and denominator of the RSE are not comparable, contrary to row 25 of the Settlement.

[16] Safety Policy Division Staff (SPD) Evaluation Report on the Southern California Edison Company's 2022 Risk Assessment and Mitigation Phase (RAMP) Application (A.)22-05-013, November 10, 2022, pg. 17.

[17] Footnote omitted. Sempra Response to Data Request (DR) TURN-10, question 1.

b. The Companies' Reliance on Direct Costs Instead of Revenue Requirement is Inaccurate for Capital Expenditure Programs

Q. Why is it inaccurate to use direct costs for capital costs in the RSE calculation?

A. For capital expenditures, which represent the most significant costs in this GRC, the direct costs paid by Sempra do not fully reflect the costs that customers pay for those capital programs. As indicated in the Companies' 2021 RAMP Application, the "direct dollar forecasts will be converted into an overall revenue requirement through the Results of Operations (RO) model."[18] Capital projects continue to incur costs to ratepayers through the rate of return, taxes, loaders, and other cost components over the life of the asset. By not accounting for the lifetime costs of risk mitigation capital projects, the Companies are very likely undervaluing total costs to ratepayers.[19] In addition, accounting for the lifetime *benefits* resulting from a capital investment, but not the lifetime costs, further exacerbates the issue that the values in the numerator and denominator of the RSE calculation are not directly comparable.

Q. How should the Commission incorporate this information into its decision-making?

A. Because Sempra says it generally does not calculate revenue requirement at the program level,[20] we do not have the information to revise Sempra's RSEs to account for this issue. However, as noted in the previous response, we expect that correcting this problem would increase the cost figures in the RSE denominator. Accordingly, the Commission

[18] 2021 RAMP, RAMP-C-33.

[19] We say "likely" because, in our experience, the present value revenue requirement over the full life of the asset for capital programs is much higher than the direct costs. However, we cannot calculate this directly because Sempra has not provided revenue requirement at the individual program level. (Sempra Response to DR TURN 18, question 3, states that, for most programs, Sempra does not calculate revenue requirement at the program level.)

[20] *Id.*

should take note of the fact that Sempra's RSEs for capital expenditure programs are almost certainly overstated. [21]

We believe RSE overstatement is the case regardless of the ultimate choice of discount rate for the revenue requirement calculation. However, this overstatement of RSE will be even more pronounced (i.e., RSEs for capital projects will be lower) if Sempra's three percent discount rate were applied to future revenue requirements, since this increases the present value of the RSE denominator relative to a higher discount rate like WACC.

3. Sempra's 3 Percent Discount Rate for the Numerator Is Insufficiently Supported

Q. What is the Companies' justification for using a 3 percent discount rate to determine the present value of the risk reduction benefits?

A. The Companies indicate that the 3 percent rate was determined based on federal recommendations.[22] They state that this value comes from a 2017 Center for Disease Control and Prevention report that cites a 1996 recommendation from the U.S. Department of Health and Human Services Panel on Cost-Effectiveness in Health and Medicine.[23] The purpose of the 2017 report was to examine workplace fatalities to help determine the "cost of fatal occupational injury" in the United States "to various constituencies, —to the Nation, to States and Census regions, to various groups,

[21] Taking the present value of the full revenue requirement would lead to a higher present value than the direct cost used by Sempra. The extent to which the present value of the cost of capital programs would be higher when taking the full revenue requirement into consideration would depend on the discount rate chosen – the lower discount rate of 3 percent selected by Sempra would result in higher present values and, hence, relatively lower RSEs, than our recommendation to use WACC.

[22] Sempra Response to TURN DR 10-1.

[23] 2021 RAMP Filing, p. RAMP-C-32.

industries, and occupations." [24] In addition, this report provides the frequency of these events to indicate the extent of the occupational health problem.[25]

Q. What does the report referenced by Sempra say about use of a 3 percent discount rate?

The Panel recommends applying a constant ***real*** discount rate (*i.e.,* exclusive of inflation, see below) of 3 percent to its cost estimates, further stating that public health evaluations assume a societal perspective and use a societal discount rate.[26]

[24] The Centers for Disease Control and Prevention, The National Institute for Occupational Safety and Health (CDC/NIOSH). *Economic Burden of Occupational Fatal Injuries in the United States*, https://www.cdc.gov/niosh/data/datasets/sd-1002-2017-0/pdfs/CFOI-CostTables_Methods_DetailedDescription_Final-508.pdf, p. 9.

[25] *Ibid.*

[26] The Centers for Disease Control and Prevention. The National Institute for Occupational Safety and Health (NIOSH). Dataset Number SD-1002-2017-0. Economic Burden of Occupational Fatal Injuries in the United States Based on the Census of Fatal Occupational Injuries, 2003-2010. More Detailed Description of the Data Collection and Analysis Methods. Available at: https://www.cdc.gov/niosh/data/datasets/sd-1002-2017-0/default.html.

> For public health evaluations that assume a societal perspective, the social discount rate—the rate at which society as a whole is willing to exchange present costs for future benefits—is appropriate. The Panel on Cost Effectiveness in Health and Medicine under the auspices of the Public Health Service recommended applying a constant real discount rate of 3%, a rate exclusive of adjustment for inflation (U.S. Department of Health and Human Services, 1996). This Panel recommended recalculating the cost estimates using alternative discount rates to demonstrate the effect of initial assumptions regarding the appropriate societal rate.[27]

Sempra contends that these federal recommendations regarding public health costs are an appropriate resource to determine a specified discount rate for benefits in the RSE analysis.[28]

Q. Do you agree with the choice of discount rate?

A. We do not. The Companies fail to make the linkage between the public health costs referenced in the CDC study and the utility investments proposed here.[29] While we recognize that benefits to safety – both to utility employees and the public – are one of the elements considered in the RSE analysis, those are not the only benefits considered. Sempra's RSE analysis also takes into account electric and gas reliability benefits to its customers and benefits of reduced financial damages caused by risk events. Thus, much

[27] The Centers for Disease Control and Prevention. The National Institute for Occupational Safety and Health (NIOSH), page 7. Dataset Number SD-1002-2017-0. Economic Burden of Occupational Fatal Injuries in the United States Based on the Census of Fatal Occupational Injuries, 2003-2010. More Detailed Description of the Data Collection and Analysis Methods. Available at: https://www.cdc.gov/niosh/data/datasets/sd-1002-2017-0/default.html.

[28] Sempra response to DR TURN-10, question 1.

[29] CDC/NIOSH, *Economic Burden of Occupational Fatal Injuries in the United States*, https://www.cdc.gov/niosh/data/datasets/sd-1002-2017-0/pdfs/CFOI-CostTables_Methods_DetailedDescription_Final-508.pdf, p. 7, states: "This Panel [U.S. Department of Health and Human Services] recommended recalculating the cost estimates using alternative discount rates to demonstrate the effect of initial assumptions regarding the appropriate societal rate. Cost estimates using multiple discount rates are presented in Appendix XII."

of the benefits that are calculated in the RSE analysis are unrelated to the workplace fatality cost estimates for which the CDC advocates use of a societal discount rate.

Q. Do you believe a societal discount rate could never be appropriate in an RSE analysis?

A. It depends on the goal and perspective of the analysis, so we would not say that a societal discount rate is never appropriate. The choice of discount rate is a decision that should be informed by the jurisdiction's applicable policy goals and the perspective of the cost-effectiveness analysis.

Based on our understanding, the primary purpose of RSE analysis is to compare alternative utility investments among each other, and for the reasons stated above in our testimony, we find a utility specific WACC to be an appropriate discount rate in this proceeding. As stated in the California Standard Practice Manual:

> Many economists have pointed out that use of a market discount rate in social cost-benefit analysis undervalues the interests of future generations. Yet if a market discount rate is not used, comparisons with alternative investments are difficult to make.[30]

Ultimately, we find that the Commission should determine a discount rate that best reflects California's regulatory perspective. If the Commission determines that the purpose of the RSE is to account for society's time preference of money, then a societal

[30] California Standard Practice Manual, Economic Analysis of Demand-Side Programs and Projects, October 2001, ("California SPM"), p. 19, footnote 7 (emphasis added). Available at: https://www.raponline.org/wp-content/uploads/2016/05/cpuc-standardpractice-manual-2001-10.pdf

discount rate is appropriate, so long as it is applied equally to both the numerator (benefits) and denominator (costs).[31]

Q. Is the RSE analysis similar to other analyses that are used to assess cost-effectiveness of utility programs?

A. Yes, the RSE analysis is similar to a utility cost test (UCT), referred to in California as the Program Administrator Cost Test (PACT), because it includes all benefits and costs that affect the operation of the utility system and the delivery of electric and gas service to customers. . The PACT is a useful test to compare and prioritize utility investments because, as stated in the California Standard Practice Manual, the PACT test "[is] intended to identify cost-effectiveness relative to other resource options."[32]] The PACT focuses on the costs of utility investment, also the most relevant here. Since the PACT identifies the extent to which utility investments will provide reduced or increased costs to ratepayers, it is valuable for informing decisions related to investment priorities and program design. This is similar to the evaluation of RSEs to inform spending priorities.

Q. What discount rate is applied to the PACT?

A. The WACC is the appropriate discount rate to use when using the PACT.[33]

Q. How did the Companies' respond to TURN's advocacy in the RAMP for use of WACC as the appropriate discount rate for the numerator and denominator?

A. In response to discovery, the Companies state that discounting all costs at the WACC would not be appropriate because only capital costs earn a return, while O&M costs do

[31] As stated above, costs should be accurately calculated with annual revenue requirements rather than direct costs.

[32] California SPM, p. 6.

[33] National Action Plan for Energy Efficiency (2007). *Guide to Resource Planning with Energy Efficiency*. Prepared by Snuller Price et al., Energy and Environmental Economics, Inc. https://www.epa.gov/sites/default/files/2015-08/documents/resource_planning.pdf, p. 5-5.

not. The Companies contend that, therefore, it may be inaccurate to discount O&M costs at the WACC.[34]

Q. Do you agree with Sempra's response?

A. No. Industry best practice for examining cost-effectiveness of utility investments supports the use of a single discount rate for all benefits and costs, even when investments have different costs of capital and risk profiles. For example, standard cost-effectiveness tests like the PACT described above, take the net-present value of costs and benefits using a single discount rate. The benefits typically provided for in a PACT include avoided capital investments in transmission and distribution systems as well as distribution O&M savings and fuel and variable O&M benefits. Whether or not an investment earns a rate of return should not dictate the choice of discount rate for future benefit or cost values.

4. Response to Safety Policy Division Comments on Discounting

Q. Has TURN previously recommended that all costs for Sempra's RSE calculation should be discounted at the WACC?

A. Yes. Within its October 22, 2021 Informal Comments and December 6, 2021 Formal Comments in Sempra's RAMP, A.21-05-011, TURN recommended that Sempra discount costs and risk reduction at the Commission-authorized WACC.[35] TURN made a similar recommendation in SCE's RAMP, A.22-05-013.

[34] Sempra response to DR TURN-10, question 2.

[35] Informal Comments of The Utility Reform Network (TURN) To the Safety Policy Division on the Sempra Utilities' RAMP Report, pgs. 24-25 (attached hereto as Appendix F) and Opening Comments of the Utility Reform Network on The SEMPRA Utilities' RAMP Reports and The Safety Policy Division's November 5, 2021 Evaluation Report, pg. 2.

Q. Did SPD respond to TURN's recommendation that utilities should apply the same discount rate to benefits and costs?

A. Yes, in SCE's RAMP. (SPD did not respond to TURN's recommendation regarding discount rates in Sempra's RAMP.) SPD disagreed with TURN, stating that the discount rate does not necessarily have to be the same for both the numerator and the denominator.[36] SPD concluded that the same discount rate need not be used in the numerator and the denominator unless the two types of outcomes in the numerator and the denominator have the same characteristics and the same built-in assumptions. Central to this conclusion was SPD's concern that it did not find it appropriate to assign less value for fatalities averted today versus those averted in the future.[37]

Q. Do you agree with SPD's conclusions regarding the treatment of discount rates for the RSE calculations?

A. No, we respectfully disagree. SPD's conclusions run counter to fundamental economic principles as well as benefit-cost analysis. RSEs are effectively benefit-cost ratios, representing numerical values that portray changes in risk scores per dollar spent based on a utility's proposal.[38] Treating the benefits resulting from a risk mitigation activity differently from the costs is an inaccurate way to approach this analysis. Mathematically, dividing two numbers that have not been consistently treated results in a skewed result. Admittedly, this error would be more obvious if the units of the numerator and denominator for the RSE calculation were the same, but the principle holds whether or

[36] Safety Policy Division Staff Evaluation Report on the Southern California Edison Company's 2022 RAMP Application (A.)22-05-013, November 10, 2022, pg. 17.

[37] SPD Evaluation Report on the Southern California Edison Company's 2022 RAMP Application (A.)22-05-013, November 10, 2022, pg. 18.

[38] Sempra 2021 RAMP Report, p. RAMP-C-26.

not the units are the same. We note in Section V below that the numerator can just as easily be expressed in dollars as risk reduction, which further emphasizes this point.

Furthermore, whether or not the same discount rate is applied to both the numerator and denominator is unrelated to the consideration of the value of avoided fatalities. SPD's discussion relates more to the *choice* of discount rate (low or high) rather than whether the same discount rate should be applied to both the numerator and the denominator. SPD states that the benefits of avoiding fatalities today should be the same or similar as those avoided in the future. This statement implies that SPD prefers a lower, societal discount rate; at least that was its view in the SCE RAMP. However, the choice of discount rate is a separate issue from whether it should be applied consistently in the numerator and denominator, and SPD appears to have conflated the two issues.

III. RECOMMENDED MODIFICATIONS TO SEMPRA'S RSE CALCULATIONS

Q. What are your recommended changes to the Companies' RSE calculations?

A. Based on the foregoing discussion, we recommend that the Companies use the Commission-authorized WACC as the discount rate to calculate the present value of the mitigation risk reduction benefit (the numerator) and the mitigation cost estimate (the denominator). We also recommend that the Companies use nominal program cost forecasts for their programs and, for the PTY RSE calculations, discount those costs at the WACC to 2024, the baseline year in which both costs and benefits begin to accrue.

Q. Did you apply these changes to the Companies' RSE calculations as presented in their 2021 RAMP?

A. Yes. Table 1 below shows the changes to Test Year (TY) and Post Test Year (PTY) RSEs resulting from our recommended changes to a sample of risk mitigation investments. The RSEs, costs, and overall RSE rank are derived from Sempra's revised Excel workpapers.[39]

With respect to the TY values, we changed the dollar year from 2021 constant dollars to 2024 nominal dollars using the Companies' escalation rate for capital costs and O&M, respectively, as specified in Sempra's response to discovery.[40] For the TY RSEs, there was no need to discount these costs, once escalated to 2024 dollars, because we are only considering costs for the single test year, which constitutes the baseline year for the RSE calculations. For the numerator, we changed the discount rate from 3 percent to the most recent Commission-approved WACC for each company (7.18% for SDG&E and 7.10% for SCG).[41]

[39] These include, for the RSEs in Table 1, SCG workpapers: "3 Final GRC PTY RSE Workpaper - SCG MP-R_53715"; "1 Final GRC PTY RSE Workpaper - SCG HP-R_53706". SDG&E workpapers: "New RSE - 2 Final GRC PTY RSE Workpaper -SDGE - EII-R_53737"; "3 Final GRC PTY RSE Workpaper - SDGE - HP-R_53722"; "New RSE - 9 Final GRC PTY RSE Workpaper - SDGE - MP-R_53728."

[40] SDG&E's escalation factors were provided in the company's response to DR TURN-30 question 3, TURN-030_Q3_SDGE.xlsx. SCG's escalation factors were provided in the company's response to DR TURN-30 question 3, attachment TURN-030_Q3_SoCalGas.xlsx.

[41] WACC values are provided in D.22-12-031 issued December 19, 2022.

With respect to the PTY values, our recommended PTY RSEs are calculated by discounting costs (provided already in nominal dollars) at WACC to 2024.[42] Consistent with our TY methodology described above, we also discounted the risk reduction (numerator) at WACC.

Table 1 shows the impact of these changes on two different types of programs – those with a long benefit life and others with a short benefit period – for both SDG&E and SoCalGas. As shown in the column in Table 1 labeled "% Change", the adoption of our recommendations reduces RSE values for both types of programs in the TY and for the long-lived programs in the PTY. This is primarily driven by the change in the numerator discount rate from Sempra's 3% to the WACC. The change in that discount rate has the greatest impact on risk mitigation activities that have longer lifetime benefits. The RSEs increase slightly for the short-lived programs in the PTY calculations because the RSE-increasing impact of discounting the PTY costs to the 2024 baseline outweighs the RSE-decreasing impact of a higher discount rate for the numerator.

[42] Since WACC is a nominal discount rate, it incorporates the effects of inflation as well. This means that costs do not need to be deflated and then discounted because we are using a nominal discount rate to discount nominal dollars.

Table 1. Illustrative Changes to RSEs Resulting from Proposed Recommendations

Company	ID	Mitigation Name	Lifetime Benefit	Test Year					Post Test Year				
				Sempra RSE w/ CFF	Sempra B/C Ratio	Revised RSE w/ CFF	Revised B/C Ratio	% Change	Sempra RSE w/ CFF	Sempra B/C Ratio	Revised RSE w/ CFF	Revised B/C Ratio	% Change
SDGE	SDG&E-RISK-9-C08-T03	Underperforming Steel Replacement Program – Other Steel (Post 1965 vintage)	68	4.4	0.1	2.2	0.1	**-51%**	5.4	0.2	3.0	0.1	**-45%**
	SDG&E-Risk-8-C15	Enhanced Employee Safe Driving Training	1	35.1	1	32.8	1.0	**-6%**	13.4	0.4	14.8	0.4	**10%**
SCG	SCG-RISK-3-C19-T1	Main Replacements-Leakage, Abnormal Op. Conditions, CP Related	68	0.4	0.0	0.2	0.0	**-51%**	0.3	0.0	0.2	0.0	**-45%**
	SCG-RISK-3-C12	Valve Inspections and Maintenance	1	35.6	1.0	32.0	0.9	**-10%**	28.5	0.8	30.9	0.9	**8%**

As discussed in Section V below, Appendix D to this testimony provides RSE and B-C Ratio results for both Sempra's calculations and incorporating our recommended changes. When considering results of the RSE analysis in funding decisions, the Commission should be aware of the impact of our recommended changes on the RSEs or B-C ratios that are being considered.

IV. RISK SPEND EFFICIENCY CAN BE EXPRESSED AS A BENEFIT-COST RATIO IN DOLLAR TERMS

Q. How do RSEs relate to the benefit-cost ratio of risk mitigation activities?

A. Each RSE is calculated by dividing risk reduction benefits by the cost to achieve that risk reduction. In this sense, RSEs already express something akin to a benefit-cost ratio, but with different units in the numerator and denominator. As a result, RSEs allow for ***relative*** comparisons of cost-effectiveness, which are useful for the important goal of prioritizing risk reduction activities given affordability constraints.[43] However, RSEs, by themselves, do not allow a clear ***stand-alone*** comparison of the dollar value of risk reduction benefits of a mitigation with that mitigation's costs. Fortunately, based on the multi-attribute value function (MAVF) methodology, the risk reduction benefits in the numerator of the RSE can be easily expressed in dollar terms to compare with the costs using the same units. Once this is done, RSEs can be converted to B-C ratios which show whether the value of expected risk reduction benefits exceed the expected costs. In this methodology, B-C ratios greater than one can be expected to have benefits greater than costs, while B-C ratios less than one are expected to have costs which exceed risk reduction benefits. For example, a B-C ratio of 0.15 means that the program would provide 15 cents of benefits for every dollar of cost and thus would not be cost-effective.

Q. How can RSEs be converted to benefit-cost ratios in dollar terms?

A. The numerator of the RSE can be converted to dollars by: calculating "weighted units," which are the percentage weights assumed by Sempra multiplied by 100; determining the

43 This can be done both within a given risk area as well as across risk areas (i.e. company-wide).

Companies' implied dollar equivalency of those weighted units under its multi-attribute value function (MAVF); and adjusting for the readability factor in Sempra's methodology. This step-by-step process is explained in Appendix C.

Based on this process, an RSE calculated using Sempra's MAVF can be expressed as a B-C ratio in dollar terms simply by dividing the RSE by 34. This conversion factor is the same for both Sempra's RSE values and the adjusted RSEs that we calculate based on the changes we recommend in this testimony.

Q. How does the process you describe to convert RSEs under Sempra's MAVF to benefit-cost ratios relate to D.22-12-027, which announces a new cost-benefit approach to risk modeling?

A. D.22-12-027 announces a transition from the MAVF approach that was adopted in the D.18-12-014 Settlement to a new "cost-benefit approach." Under this new approach, the numerator of the RSE calculation will be expressed directly in dollar terms, "obviating the need to assign attribute weights and ranges in calculating Risk Scores."[44] Utilities are required to use this new methodology in the next round of RAMP and GRC proceedings, beginning with the RAMP that PG&E will submit in 2024.[45] In the meantime, the MAVF approach adopted in the D.18-12-014 Settlement continues to apply to this GRC. As described above, under the MAVF approach, RSEs can be easily converted to B-C ratios in dollar terms. Given the usefulness of B-C ratios as a stand-alone measure of cost-effectiveness, valuable information can be gained by taking advantage of the capability of converting MAVF-based RSEs into B-C ratios.

[44] D.22-12-027, p. 11.
[45] D.22-12-027, p. 63, Ordering Paragraph 2.

V. PRESENTATION OF RSE AND BENEFIT-COST RATIO RESULTS

Q. Please provide an overview of the RSE and B-C ratio results that you provide in Appendix D.

A. Appendix D provides tables that show the RSE and B-C Ratio results for each program and tranche for which Sempra calculated an RSE. The tables include results calculated under Sempra's approach and under TURN's alternative approach described in this testimony. All of the RSEs and B-C Ratios include Sempra's allocation of foundational or Cross-Functional Factor (CFF) costs, in order to include all costs relevant to performing the activity in question.[46]

Q. Please describe each of the tables in Appendix D.

A. Appendix D includes eight tables, as follows:

Table 1: Test Year (TY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by RSE).

Table 2: Post Test Year (PTY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by RSE).

Table 3: Test Year (TY) RSE and B-C Ratio results for SoCalGas under SoCalGas' approach and TURN's approach (Sorted by RSE).

Table 4: Post Test Year (PTY) RSE and B-C Ratio results for SoCalGas under SoCalGas' approach and TURN's approach (Sorted by RSE).

[46] Ex. SCG/SDG&E-03, Chap. 2, p. RSP/GSF-17.

As indicated, each of Tables 1 through 4 sort the results from programs with the highest to lowest RSE calculated under Sempra's approach.

Tables 5 through 8 provide the same information sorted in a different way – with programs grouped according to the utilities' indication of which risk category the programs address, as follows:

Table 5: Test Year (TY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by Risk).

Table 6: Post Test Year (PTY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by Risk).

Table 7: Test Year (TY) RSE and B-C Ratio results for SoCalGas under SoCalGas' approach and TURN's approach (Sorted by Risk).

Table 8: Post Test Year (PTY) RSE and B-C Ratio results for SoCalGas under SoCalGas' approach and TURN's approach (Sorted by Risk).

For convenience, the table below provides the name of the risk associated with each numerical risk category.

Table 2. Sempra Risk Categories

SDG&E- Risk-1	Wildfire Involving SDG&E Equipment
SDG&E-Risk-2	Electric Infrastructure Integrity
SDG&E-Risk-3	Incident Related to the High Pressure System (Excluding Dig-in)
SDG&E-Risk-4	Incident Involving a Contractor

SDG&E-Risk-5	Customer and Public Safety – Contact with Electric Equipment
SDG&E-Risk-6	Cybersecurity
SDG&E-Risk-7	Excavation Damage (Dig-in) on the Gas System
SDG&E-Risk-8	Incident Involving an Employee
SDG&E-Risk-9	Incident Related to the Medium Pressure System (Excluding Dig-in)
SCG-Risk-1	Incident Related to the High Pressure System (Excluding Dig-in)
SCG-Risk-2	Excavation Damage (Dig-in) on the Gas System
SCG-Risk-3	Incident Related to the Medium Pressure System (Excluding Dig-in)
SCG-Risk-4	Incident Related to the Storage System (Excluding Dig-in)
SCG-Risk-5	Incident Involving an Employee
SCG-Risk- 6	Cybersecurity

Q. Please provide more details about the information included in the tables in Appendix D.

A. Most of the columns in the tables are self-explanatory. However, a few of the columns would benefit from explanation.

- The "Lifetime Benefit (years)" column provides Sempra's estimate of the number of years that the program will provide risk reduction benefits.

- In the Test Year tables, the difference between the "Cost (2021$)" column under Sempra's Values and the "Cost (2024$)" column under TURN's Values reflects the fact that Sempra (inappropriately, as explained in Section II above) uses 2021 dollars as its

baseline, whereas TURN uses 2024 dollars because 2024 is the year both costs and benefits begin to accrue.

- In the Post Test Year tables, the difference between the "Cost (Nominal$)" column under Sempra's Values and the "Cost (2024$)" column under TURN's Values reflects the fact that Sempra (inappropriately, as explained in Section X above) did not discount its 2025-2027 nominal costs to the 2024 baseline. TURN's values include that discounting.

- The "% Reduction in RSE" column provides the percentage by which Sempra's RSEs decreased or increased under the TURN approach. The negative values in these columns means that RSEs increased under TURN's approach. Note that the percentage change in B-C ratios is always the same as the RSE percentage change.

Q. How can the Commission use these results in making its decisions regarding the scope and funding of Sempra's proposed programs?

A. RSEs and B-C ratios are tools to help the Commission and parties ensure that finite ratepayer dollars are used in the most cost-effective manner. These tools assist in determining whether the proposed scope of the utilities' programs (*i.e.,* units of work performed) is appropriate or whether a program's proposed scope should be reduced or eliminated based on cost-effectiveness considerations. Thus, RSEs and B-C ratios are most useful for assessing programs where the utilities have some measure of discretion in the scope of work to be performed, *i.e.,* where that scope of work is not fixed by applicable laws or regulations.

RSEs and B-C ratios provide different views of the cost-effectiveness of utility programs. As noted above, RSEs provide a *relative* comparison of cost-effectiveness and thus

enable prioritization and targeting of risk reduction work to where it is most cost-effective. Proposed discretionary activities that rank relatively low in the RSE rankings warrant a strong showing by the utility that the requested funding is necessary, notwithstanding the relatively low RSE.

B-C ratios provide a *stand-alone* indication of cost-effectiveness. A B-C ratio less than 1.0 indicates that the costs exceed the risk reduction benefits and, thus, that the program or tranche under consideration is not cost-effective. The lower the B-C ratio, the stronger the utility showing should be that the activity in question is necessary notwithstanding the low B-C ratio.

Finally, both RSEs and B-C Ratios are useful for comparing the cost-effectiveness of competing risk reduction strategies. This issue particularly arises with respect to wildfire mitigation proposals, where choices need to be made between an undergrounding- or overhead-focused strategy, as discussed in the separate testimony of Eric Borden (Ex. TURN-13). The tables in this testimony do not consider changes to RSE inputs or methodology outside of those discussed herein, such as those recommended by witness Borden, Exhibit TURN-13, specific to wildfire mitigation RSE calculations.

Q. Please discuss the role of tranche-level analysis when making use of RSEs and B-C Ratios.

A. Under the D.18-12-014 Settlement, utilities are required to subdivide the group of assets associated with a risk into tranches. Each tranche should have the same risk characteristics, meaning that the assets in the tranche should have the same likelihood of

a risk event (LoRE) and the same consequences of a risk event (CoRE). Tranches provide a more granular view of how mitigations will reduce risk.[47]

RSEs and B-C ratios for appropriately granular tranches thus provide more granular information about the cost-effectiveness of proposed risk reduction activities. Tranche-level values enable better targeting of ratepayer dollars to the most cost-effective activities.

When making use of B-C ratios, care must be taken before concluding that an activity is cost-effective. If a B-C ratio applies to an entire program or a tranche that is insufficiently granular -- meaning there is a significant variation in the risk characteristics of the assets in the tranche -- the B-C ratio provides an *average* measure of cost-effectiveness for the risk reduction activity in question. For example, if the B-C ratio is 1.0 for a mitigation applying to an insufficiently granular group of assets, that means for the some of the assets in the group, the B-C ratio of the mitigation will be less than 1.0 and *not* cost-effective. In this case, by failing to design sufficiently granular tranches, the utility is masking the fact that the mitigation is not cost-effective for a subset of the tranche. Thus, before reaching a conclusion that a program or tranche is cost-effective based on a B-C ratio, it is important to consider whether Sempra's tranches meet the granularity requirements of the D.18-12-014 Settlement.

The results provided in Appendix D show all of the tranches for which Sempra calculated an RSE that it reported in its RAMP to GRC Integration testimony.[48] In Sempra's RAMP,

[47] D.18-12-014, Attachment A, p. A-11, Row 14.
[48] Ex. SCG-SDG&E-03-2R, Chap. 2, Appendix D.

Appendix A: Resume of Eric Borden

Eric Borden, Principal Associate

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PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. *Principal Associate,* May 2022 – Present

- Sponsors expert testimony and performs analyses related to utility electric vehicle incentives and policy, wildfire mitigation strategies and costs, risk modeling, rate design, cost allocation, and revenue requirement issues in General Rate Cases and Multi-year Rate Plans.
- Conducts research and analysis related to the cost-effectiveness of distributed energy resources and Integrated Resource Plans.
- Examines utility performance incentives and provides expertise on ratemaking issues.

The Utility Reform Network (TURN), San Francisco, CA*, Energy Policy Expert,* February 2015 - May 2022

- Prepared testimony, conducted analyses, drafted comments, and represented TURN in various proceedings at the California Public Utilities Commission (CPUC) related to general rate cases, wildfire-related safety applications, electric vehicle charging infrastructure, utility procurement, rate design, and demand response.

4 Thought Energy LLC, Chicago, IL. *Senior Energy Analyst*, June 2013 – January 2015

- Created financial models to forecast profits of potential site installations
- Researched state and regional public policy frameworks governing CHP
- Conducted analyses over electricity and natural gas price trends
- Developed presentations and marketing materials for investor meetings

International Renewable Energy Agency (IRENA) Bonn, Germany. *Consultant,* February 2014 – October 2014

- Hired to write a report on worldwide electricity sector battery storage, including primary applications for renewable energy integration, market developments, trends, and case studies
- Conduct research, review literature, interview key industry players, develop case study material
- Travel to Bonn, company sites, and research facilities
- Written report will be sent to policymakers in 167 IRENA member countries

Alexander von Humboldt Foundation (hosted by DIW Berlin), Berlin, Germany. *German Chancellor Fellow*, July 2012 – November 2013

- Research Project: "Energy Storage Technology and the Large-Scale Integration of Renewable Energy"
- Investigated the role of energy storage in Germany for renewable integration through literature review, interviews with German energy experts, and analysis comparing public policy support in Germany and the U.S. for storage technologies
- Invited to hold a presentation at the International Renewable Energy Storage Conference and Exhibition (IRES 2013)
- Discussions with German businesses and governmental ministries; special visit to European Union and NATO headquarters in Brussels
- Attended energy conferences and workshops in Berlin

The Kenrich Group, LLC, Chicago, IL. *Senior Consultant*, June 2008 – July 2009

- Consulted for multiple energy utilities in legal disputes with the Department of Energy (DOE)
- Performed detailed research and quantitative/qualitative analysis to analyze financial impact related to construction of coal-fired power plants, liquid natural gas facilities, and other types of construction
- Contributed to final reports and presentations submitted in arbitration, settlement, or court of law presenting KRG's expert opinion

Charles River Associates, Chicago, IL. *Associate - Intellectual Property*, July 2006 – May 2008

- Developed complex financial models including discounted cash flow, lost profit, and regression analyses to support expert reports within the context of intellectual property and financial litigation in multiple industries
- Created valuation models and supporting materials to value business entities
- Contributed to final reports and presentations submitted in arbitration, settlement, or court of law presenting CRA's expert opinion

EDUCATION

University of Texas, LBJ School of Public Affairs, Austin, Texas

Master of Public Affairs, specialization in Natural Resources and the Environment, 2012

Washington University, St. Louis, MO

B.S.B.A. Finance, Entrepreneurship, 2006

PUBLICATIONS

Battery Storage for Renewables: Market Status and Technology Outlook, International Renewable Energy Agency (IRENA), co-author with Ruud Kempener, 2015.

Germany's Energiewende, chapter 15 in Global Sustainable Communities Design Handbook, ed. Dr. Woodrow Clark, Elsevier Press, 2014.

Expert Views on the Role of Energy Storage for the German Energiewende, DIW Berlin and BMU "Stores" project, 2014.

Policy efforts for the development of storage technologies in the U.S. and Germany, DIW Discussion Paper, 2013.

Electric Vehicles and Public Charging Infrastructure: Impediments and Opportunities for Success in the United States, The University of Texas at Austin, 2012.

Clean Energy Technology and Public Policy, LBJ Journal of Public Affairs, editor and contributor, 2011.

TESTIMONY

Public Utilities Commission of Maine (Docket No. 2022-00152): Direct Testimony of Melissa Whited-and Eric Borden regarding Central Maine Power Company's request for rate design increase and changes. On behalf of the Maine Office of the Public Advocate. December 2, 2022.

A.21-06-021: Prepared Testimony Addressing Pacific Gas and Electric's Test Year 2023 General Rate Case – Wildfire Mitigation and New Customer Connections Cost Requests. June 13, 2022.

A.21-09-008: Prepared Testimony Addressing the Reasonableness of Pacific Gas and Electric 2020 Vegetation Management Balancing Account Overspend. May 25. 2022.

A.21-06-022: Prepared Testimony Addressing Pacific Gas and Electric's Framework for Substation Microgrid Solutions. March 30, 2022.

A.21-10-010: Prepared Testimony Addressing Pacific Gas and Electric's Electric Vehicle Charge 2 Proposal. March 2, 2022.

A.20-09-019: Prepared Testimony Addressing Pacific Gas and Electric's Wildfire Mitigation Memorandum Accounts. April 14, 2021.

A.19-08-013: Prepared Testimony Addressing Southern California Edison's Test Year 2021 Track 2 General Rate Case Memorandum Account Request – Wildfire Expenditures. September 4, 2020.

A.20-03-004: Joint Testimony with Eduyng Castano (SCE) Addressing Data Collection and Evaluation of the New Homes Battery Storage Pilot Program. September 1, 2020.

A.19-10-012: Prepared Testimony Addressing San Diego Gas and Electric's Power Your Drive 2 Electric Vehicle Charging Infrastructure Proposal. May 18, 2020.

A.19-08-013: Prepared Testimony Addressing Southern California Edison's General Rate Case Wildfire Management, Wildfire Risk, Vegetation Management, and New Service Connection Policy Issues and Cost Forecasts. May 5, 2020.

A.18-12-009: Prepared Testimony Addressing Pacific Gas and Electric's Enhanced Vegetation Management and System Hardening Wildfire Mitigation Expenditures. July 26, 2019.

A.18-09-002: Direct Testimony Addressing SCE's Grid Safety and Reliability Program Infrastructure Proposal. April 23, 2019.

A.18-06-015: Rebuttal Testimony Addressing SCE's Charge Ready 2 EV Infrastructure Proposal. December 21, 2018.

A.18-06-015: Direct Testimony Addressing SCE's Charge Ready 2 EV Infrastructure Proposal. November 20, 2018.

A.17-12-011: Direct Testimony Regarding Potential Effects of More "Cost Based" TOU Rates and Seasonal Differentiation of Tiered Rates. October 26, 2018.

A.18-02-016 et al.: Prepared Testimony Addressing Issues Pertaining to AB 2868 (Energy Storage). August 10, 2018.

A.17-12-002 et al.: Prepared Testimony Addressing the Proposal of SCE for Energy Storage Procurement. April 9, 2018.

A.17-01-020: Direct Testimony Addressing the Proposal of PG&E for a Fast Charging Infrastructure Program. July 25, 2017.

R.12-06-013: Direct Testimony Evaluating Hardship due to TOU Rates on Vulnerable Populations in Hot climate Zones. April 19, 2017.

A.15-09-001: Direct Testimony Addressing the Proposal of PG&E for Electric Distribution and New Business Expenditures. April 29, 2016.

A.15-02-009: Rebuttal Testimony Regarding PG&E's A.15-02-009 for EV Infrastructure and Education Program. December 21, 2015.

A.15-02-009: Direct Testimony Regarding PG&E's EV Infrastructure and Education Program. November 20, 2015.

A.14-11-003: Direct Testimony Addressing the Treatment of Solar Distributed Generation for Estimating Distribution System Capacity/Expansion Expenditures. May 15, 2015.

A.14-04-014/R.13-11-007: Testimony Regarding SDG&E's Application for Authority to Build Electric Vehicle Charging Infrastructure. April 13, 2015.

Resume updated January 2023

Appendix B: Resume of Courtney Lane

Courtney Lane, Principal Associate

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PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. *Principal Associate*, September 2022 – Present, *Senior Associate,* November 2019 – September 2022.

Provides consulting and researching services on a wide range of issues related to the electric industry including performance-based regulation, benefit-cost assessment, rate and bill impacts, and assessment of distributed energy resource policies and programs. Develops expert witness testimony in public utility commission proceedings.

National Grid, Waltham, MA. *Growth Management Lead*, *New England,* May 2019 – November 2019, *Lead Analyst for Rhode Island Policy and Evaluation,* June 2013 – April 2019.

- Portfolio management of product verticals including energy efficiency, demand response, solar, storage, distributed gas resources, and electric transportation, to optimize growth and customer offerings.
- Strategy lead for the Performance Incentive Mechanisms (PIMs) working group.
- Worked with internal and external stakeholders and led the development of National Grid's Annual and Three-Year Energy Efficiency Plans and System Reliability Procurement Plans for the state of Rhode Island.
- Represented energy efficiency and demand response within the company at various Rhode Island grid modernization proceedings.
- Led the Rhode Island Energy Efficiency Collaborative; a group focused on reaching consensuses regarding energy efficiency plans and policy issues for demand-side resources in Rhode Island.
- Managed evaluations of National Grid's residential energy efficiency programs in Rhode Island, and benefit-cost models to screen energy efficiency measures.

Citizens for Pennsylvania's Future, Philadelphia, PA. *Senior Energy Policy Analyst*, 2005–2013.

- Played a vital role in several legislative victories in Pennsylvania, including passage of energy conservation legislation that requires utilities to reduce overall and peak demand for electricity (2009); passage of the $650 million Alternative Energy Investment Act (2008); and important amendments to the Alternative Energy Portfolio Standards law vital to the development of solar energy in Pennsylvania (2007).
- Performed market research and industry investigation on emerging energy resources including wind, solar, energy efficiency and demand response.
- Planned, facilitated and participated in wind energy advocates training meetings, annual partners retreat with members of wind and solar companies, and the PennFuture annual clean energy conference.

Northeast Energy Efficiency Partnerships, Inc., Lexington, MA. *Research and Policy Analyst,* 2004–2005.

- Drafted comments and testimony on various state regulatory and legislative actions pertaining to energy efficiency.
- Tracked energy efficiency initiatives set forth in various state climate change action plans, and federal and state energy regulatory developments and requirements.
- Participated in Regional Greenhouse Gas Initiative (RGGI) stakeholder meetings.
- Analyzed cost-effectiveness of various initiatives within the organization.

Massachusetts Executive Office of Environmental Affairs, Boston, MA. *Field Projects Extern,* 2003.

- Worked for the Director of Water and Watersheds at the EOEA, examining the risks and benefits of different groundwater recharge techniques and policies throughout the U.S.
- Presented a final report to both Sea Change and the EOEA with findings and policy recommendations for the state.

EnviroBusiness, Inc., Cambridge, MA. *Environmental Scientist,* July 2000 – May 2001

- Conducted pre-acquisition assessments/due diligence assignments for properties throughout New England. Environmental assessments included an analysis of historic properties, wetlands, endangered species habitat, floodplains, and other areas of environmental concern and the possible impacts of cellular installations on these sensitive areas.

EDUCATION

Tufts University, Medford, MA
Master of Arts; Environmental Policy and Planning, 2004.

Colgate University, Hamilton, NY
Bachelor of Arts; Environmental Geography, 2000, *cum laude.*

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Incentive Mechanisms. On behalf of the Maryland Office of People's Counsel. March 3, 2021 and April 20, 2021.

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Resume updated January 2023

Appendix C: How to Express RSEs as Benefit-Cost Ratios Using Sempra's Multi-Attribute Value Function

Sempra's MAVF, as is typical of utility MAVFs, includes a Financial attribute. The other attributes in Sempra's MAVF are Safety and Reliability. The Financial attribute allows risk units measured under the MAVF approach to be expressed in dollar terms by accounting for the weighting of each attribute and the value implied by the financial attribute. Safety and Reliability impacts, measured in fatalities and customer outage minutes, can therefore be expressed in dollar terms.

The starting point for converting risk units to dollars is to determine the dollar value of each incremental unit of risk, which we call a "weighted unit."[1] Under Sempra's MAVF, there are 17 weighted units per $500M,[2] which means that 1 weighted unit is worth $29.4 million. In other words, a decrease in risk of one weighted unit creates $29.4 million in benefits:

$$\frac{\$500\ M}{17\ weighted\ units} = \frac{\$29.4\ M}{1\ weighted\ unit}$$

Sempra multiplies its RSEs by100,000 for "readability purposes," which we divide by 100 to convert "weights" back to original percentage terms.

$$RSE = \frac{weighted\ units\ risk\ reduction}{cost\ (M\$)} * \frac{100{,}000}{100}$$

The net effect of this conversion is to divide the RSE by 1000:

$$\frac{RSE}{1000} = \frac{weighted\ units\ risk\ reduction}{cost\ (M\$)}$$

[1] Weighted units are calculated by multiplying the percentage weight of each attribute, according to Sempra, by 100.
[2] This is because the upper end of the financial attribute MAVF range is $500 million, and the weight for the financial attribute is 17 percent. The Companies' MAVF can be found in Ex. SCG-SDG&E-03-2R, Appendix C.

Using the financial conversion described earlier, weighted units of risk reduction are converted to dollars of benefit, yielding a benefit-cost ratio (BCR) in dollar terms. This is equivalent to multiplying the RSE, already divided by 1000, by $29.4M:

$$\frac{RSE}{1000} * \$29.4M = RSE * \$0.0294M = BCR$$

Since 0.0294 can also be expressed as 1/34, this equation can be further simplified to:

$$RSE * \frac{1}{34}\$M = BCR$$

$$or$$

$$\frac{RSE}{34} = BCR$$

Therefore, a BCR in dollar terms can be directly calculated by dividing the RSE by 34 under the assumptions of Sempra's MAVF.

Appendix D: Tables Showing RSE and Benefit-Cost Ratio Results, as Calculated Under Sempra's Approach and TURN's Alternative Approach

Table 1. Test Year (TY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by RSE).

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra TY RSE w/ CFF	Cost (2021$ M)	Overall RSE rank	B/C Ratio	Revised TY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in RSE
1	SDG&E-RISK-3-C05-T01	Shallow/Exposed Pipe Remediations - HCA	64	4896.9	0.44	1	144.0	2431.1	0.4	2	71.5	50%
2	SDG&E-RISK-3-C02-T01	Cathodic Protection - Maintenance - HCA	1	3551.8	0.07	2	104.5	3184.7	0.1	1	93.7	10%
3	SDG&E-Risk-1-C06/M1-T2	SCADA Capacitors - (HFTD Tier 2)	25	2385.5	1.43	3	70.2	1412.8	1.6	4	41.6	41%
4	SDG&E-Risk-8-C13	Enhanced Mandatory Employee Training (OSHA)	1	1981.6	0.01	4	58.3	1853.9	0.0	3	54.5	6%
5	SDG&E-Risk-2-C10-T1-T2	Underground Cable Replacement Program (Proactive)	45	1898.4	3.76	5	55.8	927.0	4.2	6	27.3	51%
6	SDG&E-RISK-9-C06 T4	Leak Repair	68	1591.4	0.70	6	46.8	745.9	0.7	8	21.9	53%
7	SDG&E-RISK-3-C02-T02	Cathodic Protection - Maintenance - Non-HCA	1	1512.0	0.02	7	44.5	1355.8	0.0	5	39.9	10%
8	SDG&E-Risk-2-C11	Tee Modernization Program	57	1282.0	3.88	8	37.7	580.0	4.3	9	17.1	55%
9	SDG&E-RISK-9-C06 T3	Leak Repair	68	1115.7	1.06	9	32.8	522.9	1.1	10	15.4	53%
10	SDG&E-Risk-2-C28	Field SCADA RTU Replacement	45	1037.1	0.69	10	30.5	506.4	0.8	11	14.9	51%
11	SDG&E-RISK-9-C07	Pipeline Monitoring	68	931.4	2.21	11	27.4	419.7	2.4	13	12.3	55%
12	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 3)	1	904.4	0.44	12	26.6	781.6	0.5	7	23.0	14%
13	SDG&E-Risk-1-C11/M6-T1	Advanced Protection (HFTD Tier 3)	40	757.0	5.54	13	22.3	384.6	6.2	16	11.3	49%
14	SDG&E-RISK-3-C11-T01	Measurement & Regulation Station – Maintenance - HCA	46	685.1	0.31	14	20.2	347.6	0.3	18	10.2	49%
15	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 3)	1	485.7	0.09	15	14.3	435.9	0.1	12	12.8	10%
16	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 2)	1	484.6	0.53	16	14.3	418.8	0.6	14	12.3	14%
17	SDG&E-Risk-2-C18 -T2	Distribution Circuit Reliability - Overhead	45	461.5	1.81	17	13.6	225.3	2.0	26	6.6	51%
18	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 2)	10	450.9	5.03	19	13.3	344.4	5.4	19	10.1	24%
19	SDG&E-Risk-2-C18 - T1	Distribution Circuit Reliability - Underground	45	455.9	2.71	19	13.4	222.6	3.0	27	6.5	51%
20	SDG&E-RISK-7-C04	Locate & Mark Activities (HP)	1	444.4	0.29	20	13.1	398.5	0.3	15	11.7	10%
21	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 2)	10	412.3	4.17	21	12.1	314.4	4.5	19	9.2	24%
22	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 3)	10	401.1	2.52	22	11.8	306.4	2.7	21	9.0	24%
23	SDG&E-Risk-8-C3	Strong Safety Culture	1	376.3	0.24	23	11.1	352.0	0.2	17	10.4	6%
24	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 3)	10	345.6	0.73	24	10.2	263.5	0.8	23	7.7	24%
25	SDG&E-Risk-2-C08-T1	Avian Protection (HFTD Tier 3)	55	344.4	1.37	25	10.1	157.4	1.5	34	4.6	54%
26	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 2)	1	338.3	0.18	26	9.9	303.5	0.2	20	8.9	10%
27	SDG&E-RISK-3-C06-T01	Pipeline Maintenance - HCA	1	335.0	0.54	27	9.9	300.4	0.6	21	8.8	10%
28	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	1	333.1	0.09	28	9.8	298.7	0.1	22	8.8	10%
29	SDG&E-RISK-9-C11 - T2	Gas Distribution Emergency Department - Service	68	317.5	1.25	29	9.3	143.1	1.3	42	4.2	55%
30	SDG&E-RISK-3-C11-T02	Measurement & Regulation Station – Maintenance Non-HCA	46	292.7	0.07	30	8.6	148.5	0.1	38	4.4	49%
31	SDG&E-Risk-2-New 09	Strategic Pole Replacement Program (Non-HFTD)	51	288.1	6.57	31	8.5	135.0	7.3	44	4.0	53%
32	SDG&E-Risk-4-C1	Contractor Oversight Program	1	281.2	1.08	32	8.3	253.2	1.1	24	7.4	10%
33	SDG&E-Risk-1-C9/M4-T2	PSPS Sectionalizing (HFTD Tier 2)	20	255.1	1.57	33	7.5	161.1	1.7	32	4.7	37%
34	SDG&E-Risk-2-C4	Distribution Overhead Switch Replacement Program	55	251.5	0.91	34	7.4	115.1	1.0	51	3.4	54%
35	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators -(HFTD Tier 3)	25	245.9	0.53	35	7.2	145.6	0.6	41	4.3	41%
36	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 3)	25	240.2	0.18	36	7.1	147.7	0.2	40	4.3	39%
37	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 3)	25	223.0	1.96	37	6.6	132.1	2.2	45	3.9	41%
38	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators- (HFTD Tier 2)	25	222.1	0.53	38	6.5	131.5	0.6	47	3.9	41%
39	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 3)	10	208.7	4.41	39	6.1	159.2	4.7	33	4.7	24%
40	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 3)	1	201.9	12.35	40	5.9	181.2	13.2	30	5.3	10%
41	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 3)	10	198.1	15.17	41	5.8	148.4	16.5	39	4.4	25%
42	SDG&E-Risk-8-C8	OSHA Voluntary Protection Program	1	194.5	0.22	42	5.7	181.9	0.2	29	5.4	6%
43	SDG&E-RISK-3-C05-T02	Shallow/Exposed Pipe Remediations - Non-HCA	64	190.9	0.10	43	5.6	94.8	0.1	55	2.8	50%
44	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 2)	1	182.2	14.89	44	5.4	163.5	15.9	31	4.8	10%
45	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 2)	10	172.9	1.10	45	5.1	131.9	1.2	46	3.9	24%
46	SDG&E-Risk-1-C27	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 3)	1	169.7	2.30	46	5.0	151.4	2.5	36	4.5	11%
47	SDG&E-RISK-7-C13	Locating Equipment	5	166.6	0.24	47	4.9	150.3	0.2	37	4.4	10%
48	SDG&E-Risk-8-C9	Safe Driving Programs	1	163.3	0.09	48	4.8	152.8	0.1	35	4.5	6%
49	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 2)	10	158.5	5.83	49	4.7	120.9	6.2	49	3.6	24%
50	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 3)	40	157.1	261.84	50	4.6	120.7	198.6	50	3.5	23%
51	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 3)	1	154.7	2.82	51	4.5	138.4	3.0	43	4.1	11%
52	SDG&E-RISK-3-C01-T01	Cathodic Protection - Capital - HCA	64	152.8	0.85	52	4.5	75.9	0.8	59	2.2	50%
53	SDG&E-Risk-2-C14	DOE Switch Replacement – Underground	45	147.9	6.34	53	4.4	72.2	7.1	61	2.1	51%
54	SDG&E-RISK-3-C06-T02	Pipeline Maintenance - Non-HCA	1	144.3	0.12	54	4.2	129.4	0.1	48	3.8	10%
55	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	68	128.8	4.23	55	3.8	58.0	4.5	64	1.7	55%
56	SDG&E-Risk-8-C4	Employee Behavioral Accident Prevention Process Program	1	122.3	0.49	56	3.6	114.4	0.5	52	3.4	6%
57	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 3)	15	120.6	10.35	57	3.5	81.8	11.5	58	2.4	32%
58	SDG&E-RISK-7-C11	Damage Prevention Analyst Program	1	110.9	0.09	58	3.3	99.4	0.1	53	2.9	10%
59	SDG&E-Risk-4-M2	Enhanced Verification of Class 1 Contractor Employee Specific Training	1	108.8	0.35	59	3.2	94.0	0.4	56	2.8	14%
60	SDG&E-RISK-7-C16-T1/T2/T3/T4	Public Awareness	1	108.3	0.03	60	3.2	97.1	0.0	54	2.9	10%
61	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 3)	1	97.5	3.05	61	2.9	87.5	3.3	57	2.6	10%
62	SDG&E-RISK-3-C04-T02	Pipeline Relocation/Replacement - Non-HCA	64	88.7	0.10	62	2.6	44.1	0.1	74	1.3	50%
63	SDG&E-RISK-9-C05	Reg Station Replacement Program	47	85.0	0.71	63	2.5	46.4	0.7	71	1.4	45%
64	SDG&E-Risk-2-C29-T1	SCADA Capacitors - Overhead	12	83.7	0.76	64	2.5	59.5	0.8	62	1.7	29%
65	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 2)	1	82.1	3.26	65	2.4	73.7	3.5	60	2.2	10%
66	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 2)	40	76.7	153.78	66	2.3	58.1	116.7	63	1.7	24%
67	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 2)	25	72.8	0.18	67	2.1	44.8	0.2	72	1.3	39%
68	SDG&E-Risk-2-C29-T2	SCADA Capacitors - Undergroundf	12	62.3	0.32	68	1.8	44.3	0.4	73	1.3	29%
69	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 2)	1	61.3	0.96	69	1.8	55.0	1.0	65	1.6	10%
70	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 3)	40	61.1	1.07	70	1.8	31.0	1.2	80	0.9	49%
71	SDG&E-RISK-9-C06 T2	Leak Repair	68	60.5	6.37	71	1.8	28.3	6.6	82	0.8	53%
72	SDG&E-Risk-4-C2	Field Safety Oversight	1	59.6	6.35	72	1.8	52.6	6.9	67	1.5	12%
73	SDG&E-Risk-8-M1	Purchasing and testing more protective respiratory protection	1	58.3	0.10	73	1.7	54.5	0.1	66	1.6	6%
74	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 3)	1	57.6	2.27	74	1.7	51.6	2.4	68	1.5	10%
75	SDG&E-RISK-7-C15-T1/T2/T3/T4	Public Awareness	1	55.9	0.17	75	1.6	50.2	0.2	69	1.5	10%
76	SDG&E-RISK-9-C11 - T1	Gas Distribution Emergency Department - Mains	68	53.7	1.88	76	1.6	24.2	2.0	87	0.7	55%
77	SDG&E-RISK-7-C12	Damage Prevention Analyst Program	1	52.8	0.02	77	1.6	47.3	0.0	70	1.4	10%
78	SDG&E-Risk-1-C7/M2-T1	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 3)	40	51.1	49.04	78	1.5	26.0	54.6	85	0.8	49%
79	SDG&E-RISK-3-C01-T02	Cathodic Protection - Capital - Non-HCA	64	49.4	0.19	78	1.5	24.5	0.2	86	0.7	50%
80	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 2)	25	47.7	0.22	79	1.4	28.2	0.2	83	0.8	41%
81	SDG&E-RISK-7-M2	Automate Third Party Excavation Incident Reporting	5	43.6	0.00	80	1.3	36.3	0.0	75	1.1	17%
82	SDG&E-RISK-3-C04-T01	Pipeline Relocation/Replacement - HCA	64	42.8	0.44	81	1.3	21.3	0.4	88	0.6	50%
83	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	42.2	0.26	82	1.2	32.3	0.3	79	1.0	23%
84	SDG&E-Risk-2-C6	Tree Trimming (non-HFTD)	1	39.3	19.91	83	1.2	35.2	21.3	76	1.0	10%
85	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 2)	1	39.1	3.51	84	1.1	35.0	3.8	77	1.0	10%
86	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 2)	40	38.0	13.39	85	1.1	19.3	14.9	90	0.6	49%
87	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 3)	40	37.0	5.50	86	1.1	19.5	5.9	89	0.6	47%
88	SDG&E-Risk-2-C20-T5	Substation Reliability for Distribution Components – Miramar 12kV Replacements	51	36.8	0.11	87	1.1	17.2	0.1	95	0.5	53%
89	SDG&E-Risk-2-C8	Aviation Protection Program	55	35.9	1.71	89	1.1	16.4	1.9	97	0.5	54%
90	SDG&E-Risk-8-C15	Enhanced Employee Safe Driving Training	1	35.1	0.85	90	1.0	32.8	0.9	78	1.0	6%
91	SDG&E-Risk-1-C7/M2-T2	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 2)	40	34.8	10.77	91	1.0	17.7	12.0	93	0.5	49%
92	SDG&E-RISK-9-C06 T1	Leak Repair	68	34.6	10.07	91	1.0	16.2	10.4	99	0.5	53%
93	SDG&E-RISK-3-New-FIMP-Trans	NEW - Facility Integrity Management (FIMP)- Transmission	2.5	33.8	0.09	92	1.0	30.7	0.1	81	0.9	9%
94	SDG&E-RISK-7-M1	Automate Third Party Excavation Incident Reporting	5	32.1	0.02	93	0.9	26.7	0.0	85	0.8	17%

95	SDG&E-RISK-3-C03-T02	Leak Repair - Non-HCA	64	31.2	0.20	94	0.9	15.5	0.2	100	0.5	50%
96	SDG&E-Risk-2-C16	GO 165 Manhole, Vault Restoration Program	45	31.0	4.73	95	0.9	15.1	5.3	103	0.4	51%
97	SDG&E-Risk-2-C1	Overhead Public Safety (OPS) Program	55	27.6	7.40	96	0.8	12.6	8.2	105	0.4	54%
98	SDG&E-Risk-1-C10/M5-T2	Microgrids (HFTD Tier 2)	20	25.7	4.01	97	0.8	16.2	4.5	98	0.5	37%
99	SDG&E-Risk-2-C3	4kV Modernization Program – Distribution	55	24.7	7.17	98	0.7	11.3	8.0	106	0.3	54%
100	SDG&E-RISK-3-C03-T01	Leak Repair - HCA	64	21.1	0.89	100	0.6	10.5	0.9	107	0.3	50%
101	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 3)	1	20.2	12.66	101	0.6	17.4	14.1	94	0.5	14%
102	SDG&E-Risk-8-M2	Purchasing break/rest trailers with filtered air systems to reduce wildfire smoke exposure	1	19.8	0.15	102	0.6	18.5	0.2	91	0.5	6%
103	SDG&E Risk 8-New01	Industrial Athletic Trainer	1	19.0	0.50	103	0.6	17.8	0.5	93	0.5	6%
104	SDG&E-RISK-3-New-FIMP-Dist	NEW - Facility Integrity Management (FIMP)- Distribution	2.5	18.4	0.34	104	0.5	16.7	0.4	96	0.5	9%
105	SDG&E-RISK-3-C15-T01	Integrity Assessments & Remediation - HCA	7	18.3	19.36	105	0.5	15.3	20.0	102	0.4	16%
106	SDG&E-Risk-2-C13	Replacement of Live Front Equipment - Proactive	57	17.3	0.77	106	0.5	7.8	0.9	109	0.2	55%
107	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities	1	17.1	5.08	107	0.5	15.3	5.4	101	0.5	10%
108	SDG&E-RISK-9-C01	Cathodic Protection - O&M	4.1	14.9	0.11	108	0.4	12.6	0.1	104	0.4	15%
109	SDG&E-RISK-9-M03	Replace Curb Valves with EFVs	68	10.1	1.90	109	0.3	4.9	1.9	117	0.1	51%
110	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 2)	1	9.4	1.23	110	0.3	8.4	1.3	108	0.2	10%
111	SDG&E-RISK-3-C10-T01	Measurement & Regulation Station – Capital - HCA	46	9.2	0.73	111	0.3	5.1	0.7	116	0.1	45%
112	SDG&E-Risk-2-New 03	La Jolla 69/12kV Transformer Replacement	51	8.9	0.12	112	0.3	4.2	0.1	118	0.1	53%
113	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities	1	8.6	1.27	113	0.3	7.7	1.4	110	0.2	10%
114	SDG&E-RISK-3-C15-T02	Integrity Assessments & Remediation - Non-HCA	10	8.5	1.02	114	0.2	6.7	1.1	112	0.2	21%
115	SDG&E-RISK-9-C09-T01	Early Vintage Program (Components) - Oil Drip Piping Removal	68	8.2	1.63	115	0.2	3.7	1.7	120	0.1	55%
116	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 2)	1	7.8	6.98	116	0.2	7.0	7.5	111	0.2	10%
117	SDG&E-RISK-3-M02-T02	Gas Transmission Safety Rule - MAOP Reconfirmation - Non-HCA	8.71	7.0	1.74	117	0.2	5.7	1.8	114	0.2	19%
118	SDG&E-RISK-7-C03	Locate and Mark Activities*	1	6.5	10.23	118	0.2	5.8	11.0	113	0.2	10%
119	SDG&E-RISK-3-C09	Compressor Station - Maintenance	1	6.4	3.37	119	0.2	5.7	3.6	115	0.2	10%
120	SDG&E-Risk-2-New 05	San Marcos Substation 69kV Rebuild & 12kV Switchgear	51	5.0	0.11	120	0.1	2.3	0.1	122	0.1	53%
121	SDG&E-RISK-3-M02-T01	Gas Transmission Safety Rule - MAOP Reconfirmation - HCA	8.71	5.0	26.93	121	0.1	4.0	27.8	119	0.1	19%
122	SDG&E-RISK-9-C08-T03	Underperforming Steel Replacement Program – Other Steel (Post 1965 vintage)	68	4.4	3.25	122	0.1	2.2	3.2	123	0.1	51%
123	SDG&E-Risk-2-C20 -T2	Substation Reliability for Distribution Components – Bernardo 12kV Breakers	51	3.7	1.02	123	0.1	1.7	1.1	125	0.1	53%
124	SDG&E-RISK-3-C13	Security and Auxiliary Equipment	10	3.5	0.25	124	0.1	2.9	0.2	121	0.1	17%
125	SDG&E-RISK-3-C08	Compressor Stations - Capital	50	3.3	7.11	125	0.1	1.8	7.0	124	0.1	46%
126	SDG&E-Risk-2-C15	GO165 Corrective Maintenance Program – Underground	45	3.2	12.31	126	0.1	1.5	13.7	127	0.05	51%
127	SDG&E-Risk-2-C20-T8	Substation Reliability for Distribution Components – Coronado 69/12kV Transformer Replacements	51	2.8	0.76	127	0.1	1.3	0.8	130	0.04	53%
128	SDG&E-RISK-9-C03	Piping in Vaults Replacement Program	40	2.6	1.63	128	0.1	1.5	1.6	128	0.04	42%
129	SDG&E-RISK-3-C12	Odorization	1	1.9	0.01	129	0.1	1.7	0.0	126	0.05	10%
130	SDG&E-RISK-7-C09	Locate and Mark Quality Assurance	1	1.5	0.43	130	0.04	1.3	0.5	129	0.04	10%
131	SDG&E-RISK-3-C10-T02	Measurement & Regulation Station – Capital - Non-HCA	46	1.3	0.16	131	0.04	0.7	0.2	132	0.02	45%
132	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	1.2	4.61	132	0.04	0.9	4.6	131	0.03	23%
133	SDG&E-RISK-9-C08-T02	Underperforming Steel Replacement Program (1934-1965 vintage)	68	1.1	3.25	133	0.03	0.5	3.5	136	0.02	55%
134	SDG&E-Risk-2-New 02	Stuart 12kV Transformer Replacement	51	1.1	0.95	134	0.03	0.5	1.1	137	0.02	53%
135	SDG&E-RISK-9-C09-T03	Early Vintage Program (Components) - Removal of Closed Valves between High/Medium Pressure Zones	68	1.1	1.63	135	0.03	0.5	1.6	135	0.02	51%
136	SDG&E-Risk-2-C10-T3	Underground Cable Replacement Program (Proactive) – North Harbor Project	45	1.0	8.51	136	0.03	0.5	9.5	138	0.01	51%
137	Moreno Principal	Moreno Principal	35	1.0	178.25	137	0.03	0.6	176.4	133	0.02	40%
138	SDG&E-RISK-9-C10	Code Compliance Mitigation	40	0.9	2.88	138	0.03	0.5	2.9	134	0.02	42%
139	SDG&E-Risk-2-C21	Distribution Substation Obsolete Equipment	51	0.9	2.31	139	0.03	0.4	2.6	139	0.013	53%
140	SDG&E-RISK-9-C05	Regulator Station Replacement	47	0.7	1.41	140	0.02	0.4	1.4	142	0.011	45%
141	SDG&E-RISK-9-C09-T02	Early Vintage Program (Components) - Dresser Mechanical Coupling Removal	68	0.5	2.17	141	0.015	0.2	2.3	144	0.007	55%
142	SDG&E-RISK-9-C01	Cathodic Protection Program - O&M	4	0.5	1.88	142	0.014	0.4	2.0	140	0.012	15%
143	SDG&E-RISK-9-C14	Human Factors Mitigations - Operator Qualification Training and Certification	3	0.4	2.28	143	0.012	0.4	2.4	141	0.011	14%
144	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements	10	0.4	0.12	144	0.010	0.3	0.1	143	0.009	17%
145	SDG&E-RISK-9-C08-T01	Underperforming Steel Replacement Program – Threaded Main (pre-1933 vintage)	68	0.3	7.59	145	0.009	0.1	7.8	145	0.004	53%
146	SDG&E-RISK-9-C16-T01	DIMP – DREAMS – Vintage Integrity Plastic Plan (VIPP)	68	0.2	79.54	146	0.006	0.1	82.0	147	0.003	53%
147	SDG&E-RISK-9-C21	CSF Quality Assurance (QA) Program	5	0.1	0.28	147	0.004	0.1	0.3	146	0.004	17%
148	SDG&E-RISK-9-C19	Field and Public Safety	1	0.0	12.04	148	0.001	0.0	12.9	148	0.001	10%
149	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements - Base	10	0.0	2.05	149	0.001	0.0	2.2	150	0.0	24%
150	SDG&E-RISK-9-C20	Natural Gas Appliance Testing (NGAT) or Carbon Monoxide Testing	1	0.0	0.68	150	0.001	0.0	0.7	149	0.0	10%
151	SDG&E-Risk-2-C24	Urban Substation Rebuild	51	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
152	SDG&E-Risk-2-New 01	Mission 12KV Replacements	51	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
153	SDG&E-Risk-2-New 04	Poway 69kV Substation Rebuild	51	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
154	SDG&E-Risk-2-New 06	Substation Modification To Support FLISR	51	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
155	SDG&E-Risk-2-New 07	Torrey Pines 12kV Breaker Replacements	51	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
156	SDG&E-Risk-2-New 08	El Cajon 12kV Breaker Replacements	51	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
157	SDG&E-RISK-3-M04	Adobe Falls Relocation Project	64	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
158	SDG&E-Risk-8-C14	Enhanced Safety in Action Program	1	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
159	SDG&E RISK 8-C16	Energized Skills Training and Testing Yard	1	0.0	0.00	151	0.00	0.0	0.0	151	0.0	0%
160	SDG&E-RISK-9-M04	New RAMP Mitigation: MSAs inside Bldgings and Alcoves	68	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
161	SDG&E-Risk-1-C06/M1 T2	SCADA Capacitors - (HFTD Tier 3)	0	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
162	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 2)	15	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
163	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 2)	40	0.0	0.03	151	0.0	0.0	0.0	151	0.0	0%
164	SDG&E-Risk-1-C9/M4-T1	PSPS Sectionalizing (HFTD Tier 3)	20	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
165	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 3)	0	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
166	SDG&E-Risk-1-C27-T2	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 2)	0	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%

Table 2. Post Test Year (PTY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by RSE).

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Post Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra PTY RSE w/ CFF	Cost (Nominal $ M)	Overall RSE rank	B/C Ratio	Revised PTY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in RSE
1	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 3)	10	4804.7	0.17	1	141.3	4504.3	0.2	1	132.5	6%
2	SDG&E-RISK-3-C02-T01	Cathodic Protection - Maintenance - HCA	1	2718.9	0.09	2	80.0	3005.4	0.1	2	88.4	-11%
3	SDG&E-RISK-3-C05-T01	Shallow/Exposed Pipe Remediations - HCA	64	2119.5	1.21	3	62.3	1183.9	1.0	6	34.8	44%
4	SDG&E-Risk-1-C06/M1-T2	SCADA Capacitors - (HFTD Tier 2)	25	2037.0	5.51	4	59.9	1539.8	4.8	3	45.3	24%
5	SDG&E-Risk-8-C13	Enhanced Mandatory Employee Training (OSHA): Certified Occupational Safety Specialist, Certified Utility Safety Professional; Certified Safety Professional	1	1208.8	6.77	5	35.6	1333.2	5.9	4	39.2	-10%
6	SDG&E-RISK-3-C02-T02	Cathodic Protection - Maintenance - Non-HCA	1	1158.2	0.02	6	34.1	1280.3	0.0	5	37.7	-11%
7	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 3)	1	779.7	1.70	7	22.9	860.1	1.5	7	25.3	-10%
8	SDG&E-RISK-9-C07	Pipeline Monitoring (Leak Mitigation, Bridge & Span, Unstable Earth, and Pipeline Patrol	68	681.6	3.01	8	20.0	374.8	2.6	13	11.0	45%
9	SDG&E-Risk-1-C11/M6-T1	Advanced Protection (HFTD Tier 3)	40	646.4	21.40	9	19.0	419.2	18.6	12	12.3	35%
10	SDG&E-RISK-3-C11-T01	Measurement & Regulation Station – Maintenance - HCA	46	524.4	0.40	10	15.4	325.2	0.3	17	9.6	38%
11	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	1	511.5	0.11	11	15.0	565.4	0.1	8	16.6	-11%
12	SDG&E-RISK-9-C06 T4	Leak Repair	68	463.2	2.39	12	13.6	254.5	2.1	22	7.5	45%
13	SDG&E-RISK-3-New-FIMP-Trans	NEW - Facility Integrity Management (FIMP)- Transmission	2.5	437.4	0.29	13	12.9	468.9	0.3	10	13.8	-7%
14	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 3)	1	428.6	0.32	14	12.6	472.8	0.3	9	13.9	-10%
15	SDG&E-Risk-2-C10-T1-T2	Underground Cable Replacement Program (Proactive)	45	426.4	14.87	15	12.5	266.0	12.9	20	7.8	38%
16	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 2)	1	417.8	2.01	16	12.3	460.9	1.8	11	13.6	-10%
17	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 2)	10	374.4	25.89	17	11.0	351.0	22.6	15	10.3	6%

18	SDG&E-Risk-2-C11	Tee Modernization Program	57	341.2	13.26	18	10.0	197.2	11.5	24	5.8	42%
19	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 3)	10	335.5	12.94	19	9.9	314.5	11.3	18	9.3	6%
20	SDG&E-RISK-7-C04	Locate & Mark Activities (HP)	1	327.2	0.39	20	9.6	361.7	0.3	14	10.6	-11%
21	SDG&E-RISK-9-C06 T3	Leak Repair	68	326.0	3.63	21	9.6	179.1	3.2	26	5.3	45%
22	SDG&E-Risk-2-C08-T1	Avian Protection (HFTD Tier 3)	55	299.9	4.82	22	8.8	175.0	4.2	29	5.1	42%
23	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 2)	1	298.8	0.65	23	8.8	329.7	0.6	16	9.7	-10%
24	SDG&E-RISK-9-C05	Reg Station Replacement Program	47	254.1	1.29	24	7.5	156.2	1.1	34	4.6	39%
25	SDG&E-Risk-4-C1	Contractor Oversight Program	1	247.2	1.22	25	7.3	271.7	1.1	19	8.0	-10%
26	SDG&E-Risk-4-M2	Enhanced Verification of Class 1 Contractor Employee Specific Training	1	237.6	0.16	26	7.0	261.1	0.1	21	7.7	-10%
27	SDG&E-RISK-9-C11 - T2	Gas Distribution Emergency Department - Service	68	233.4	1.70	27	6.9	128.4	1.5	43	3.8	45%
28	SDG&E-Risk-8-C3	Strong Safety Culture	1	229.5	267.57	28	6.8	253.1	233.1	23	7.4	-10%
29	SDG&E-RISK-3-C11-T02	Measurement & Regulation Station – Maintenance Non-HCA	46	224.2	0.09	29	6.6	139.0	0.1	40	4.1	38%
30	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 3)	40	223.9	779.74	30	6.6	143.6	686.7	37	4.2	36%
31	SDG&E-Risk-1-C9/M4-T2	PSPS Sectionalizing (HFTD Tier 2)	20	217.8	6.05	31	6.4	175.6	5.3	28	5.2	19%
32	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 3)	25	212.2	0.68	32	6.2	160.4	0.6	32	4.7	24%
33	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators -(HFTD Tier 3)	25	210.0	2.06	33	6.2	158.7	1.8	33	4.7	24%
34	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 3)	25	190.4	7.59	34	5.6	144.0	6.6	36	4.2	24%
35	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators- (HFTD Tier 2)	25	189.6	2.06	35	5.6	143.3	1.8	38	4.2	24%
36	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 3)	10	184.4	16.47	36	5.4	172.9	14.3	30	5.1	6%
37	SDG&E-RISK-3-C05-T02	Shallow/Exposed Pipe Remediations - Non-HCA	64	181.9	0.27	37	5.4	101.6	0.2	46	3.0	44%
38	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 3)	1	178.4	46.10	38	5.2	196.8	40.2	25	5.8	-10%
39	SDG&E-RISK-3-C01-T01	Cathodic Protection - Capital - HCA	64	169.6	2.18	39	5.0	94.7	1.9	51	2.8	44%
40	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 2)	1	161.0	55.59	40	4.7	177.6	48.4	27	5.2	-10%
41	SDG&E-Risk-2-C28	Field SCADA RTU Replacement	45	156.5	4.00	41	4.6	97.6	3.5	48	2.9	38%
42	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 2)	10	152.8	4.10	42	4.5	143.2	3.6	39	4.2	6%
43	SDG&E-Risk-1-C27	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 3)	1	145.6	8.84	43	4.3	160.6	7.7	31	4.7	-10%
44	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 2)	10	140.0	21.75	44	4.1	131.3	18.9	41	3.9	6%
45	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 2)	40	138.8	356.76	45	4.1	87.2	320.9	55	2.6	37%
46	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 3)	1	132.4	10.86	46	3.9	146.0	9.5	35	4.3	-10%
47	SDG&E-Risk-8-C8	OSHA Voluntary Protection Program	1	118.6	241.61	47	3.5	130.8	210.5	42	3.8	-10%
48	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 2)	10	115.4	15.57	48	3.4	108.2	13.6	45	3.2	6%
49	SDG&E-Risk-2-C18 -T2	Distribution Circuit Reliability - Overhead	45	113.4	5.50	49	3.3	70.8	4.8	59	2.1	38%
50	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 3)	15	106.5	38.65	50	3.1	92.2	33.7	52	2.7	13%
51	SDG&E-RISK-3-C06-T01	Pipeline Maintenance - HCA	1	101.8	1.76	51	3.0	112.5	1.5	44	3.3	-10%
52	SDG&E-Risk-2-C18 - T1	Distribution Circuit Reliability - Underground	45	98.5	10.24	52	2.9	61.4	8.9	61	1.8	38%
53	SDG&E-RISK-7-C13	Locating Equipment	5	96.3	1.27	53	2.8	98.6	1.1	47	2.9	-2%
54	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	68	92.0	5.75	54	2.7	50.6	5.0	68	1.5	45%
55	SDG&E-Risk-4-C2	Field Safety Oversight	1	86.7	4.36	55	2.6	95.3	3.8	49	2.8	-10%
56	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 3)	1	86.2	11.39	56	2.5	95.1	9.9	50	2.8	-10%
57	SDG&E-RISK-7-C11	Damage Prevention Analyst Program	1	81.5	0.13	57	2.4	90.1	0.1	53	2.6	-11%
58	SDG&E-RISK-7-C16-T1/T2/T3/T4	Public Awareness	1	79.8	0.05	58	2.3	88.2	0.0	54	2.6	-11%
59	SDG&E-Risk-8-C4	Employee Behavioral Accident Prevention Process Program	1	74.6	548.70	59	2.2	82.3	478.1	56	2.4	-10%
60	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 2)	1	72.5	12.18	60	2.1	80.0	10.6	57	2.4	-10%
61	SDG&E RISK 8-C16	Energized Skills Training and Testing Yard	1	68.7	397.28	61	2.0	75.8	346.2	58	2.2	-10%
62	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 2)	25	64.3	0.68	62	1.9	48.6	0.6	69	1.4	24%
63	SDG&E-Risk-8-C9	Safe Driving Programs	1	62.6	102.74	63	1.8	69.0	89.5	60	2.0	-10%
64	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	62.1	0.79	64	1.8	53.8	0.7	65	1.6	13%
65	SDG&E-RISK-3-C01-T02	Cathodic Protection - Capital - Non-HCA	64	55.4	0.48	65	1.6	30.9	0.4	76	0.9	44%
66	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 3)	10	54.9	57.69	66	1.6	51.5	50.3	67	1.5	6%
67	SDG&E-RISK-3-C15-T02	Integrity Assessments & Remediation - Non-HCA	10	54.8	5.04	67	1.6	53.1	4.3	66	1.6	3%
68	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 2)	1	54.2	3.60	68	1.6	59.7	3.1	62	1.8	-10%
69	SDG&E Risk 8-New01	Industrial Athletic Trainer	1	52.9	168.22	69	1.6	58.4	146.6	63	1.7	-10%
70	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 3)	40	52.2	4.13	70	1.5	33.8	3.6	75	1.0	35%
71	SDG&E-Risk-2-C4	Distribution Overhead Switch Replacement Program	55	52.1	4.04	71	1.5	30.4	3.5	78	0.9	42%
72	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 3)	1	50.8	8.47	72	1.5	56.1	7.4	64	1.6	-10%
73	SDG&E-RISK-3-M04	Adobe Falls Relocation Project	64	46.2	2.70	73	1.4	25.8	2.4	81	0.8	44%
74	SDG&E-RISK-9-C09-T01	Early Vintage Program (Components) - Oil Drip Piping Removal	68	45.9	5.55	74	1.4	25.2	4.8	82	0.7	45%
75	SDG&E-RISK-3-C06-T02	Pipeline Maintenance - Non-HCA	1	43.9	0.39	75	1.3	48.5	0.3	70	1.4	-10%
76	SDG&E-RISK-7-C15-T1/T2/T3/T4	Public Awareness	1	41.1	0.23	76	1.2	45.4	0.2	71	1.3	-11%
77	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 2)	25	40.7	0.86	77	1.2	30.8	0.7	77	0.9	24%
78	SDG&E-RISK-9-M04	New RAMP Mitigation: MSAs inside Bldgings and Alcoves	68	40.7	1.85	78	1.2	22.3	1.6	84	0.7	45%
79	SDG&E-RISK-7-C12	Damage Prevention Analyst Program	1	38.9	0.02	79	1.1	42.9	0.0	72	1.3	-11%
80	SDG&E-RISK-9-C11 - T1	Gas Distribution Emergency Department - Mains	68	38.4	2.55	80	1.1	21.1	2.2	86	0.6	45%
81	SDG&E-Risk-8-M1	Purchasing and testing more protective respiratory protection for wildfire smoke particulates.	1	35.6	115.16	81	1.0	39.2	100.3	73	1.2	-10%
82	SDG&E-Risk-2-C14	DOE Switch Replacement – Underground	45	33.8	26.81	82	1.0	21.1	23.3	87	0.6	38%
83	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 2)	1	33.4	13.55	83	1.0	36.9	11.8	74	1.1	-10%
84	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 2)	40	32.5	51.75	84	1.0	21.1	45.1	88	0.6	35%
85	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 3)	40	31.6	21.25	85	0.9	20.5	18.5	89	0.6	35%
86	SDG&E-Risk-1-C7/M2-T1	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 3)	40	31.3	510.55	86	0.9	20.3	444.8	90	0.6	35%
87	SDG&E-RISK-3-C04-T02	Pipeline Relocation/Replacement - Non-HCA	64	29.5	2.33	87	0.9	16.5	2.0	98	0.5	44%
88	SDG&E-RISK-3-C09	Compressor Station - Maintenance	1	27.4	4.33	88	0.8	30.3	3.8	79	0.9	-11%
89	SDG&E-RISK-3-C15-T01	Integrity Assessments & Remediation - HCA	7	26.8	52.29	89	0.8	26.4	45.8	80	0.8	2%
90	SDG&E-Risk-2-C8	Aviation Protection Program	55	26.1	5.08	90	0.8	15.2	4.4	99	0.4	42%
91	SDG&E-RISK-9-C01	Cathodic Protection - O&M	4.1	23.6	0.35	91	0.7	24.6	0.3	83	0.7	-4%
92	SDG&E-RISK-9-C06 T2	Leak Repair	68	22.3	16.99	92	0.7	12.2	14.8	104	0.4	45%
93	SDG&E-Risk-1-C10/M5-T2	Microgrids (HFTD Tier 2)	20	22.2	15.27	93	0.7	17.9	13.3	94	0.5	19%
94	SDG&E-Risk-2-C29-T1	SCADA Capacitors - Overhead	12	21.6	2.08	94	0.6	19.6	1.8	92	0.6	9%
95	SDG&E-Risk-1-C7/M2-T2	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 2)	40	20.8	112.07	95	0.6	13.5	97.6	101	0.4	35%
96	Moreno Principal	Moreno Principal	35	20.6	69.20	96	0.6	13.2	63.9	102	0.4	36%
97	SDG&E-RISK-3-C03-T02	Leak Repair - Non-HCA	64	20.1	0.53	97	0.6	11.2	0.5	107	0.3	44%
98	SDG&E-Risk-2-C29-T2	SCADA Capacitors - Undergroundf	12	19.7	0.87	98	0.6	17.9	0.8	95	0.5	9%
99	SDG&E-Risk-2-C6	Tree Trimming (non-HFTD)	1	19.5	27.31	99	0.6	21.5	23.7	85	0.6	-11%
100	SDG&E-RISK-3-M02-T02	Gas Transmission Safety Rule - MAOP Reconfirmation - Non-HCA	8.71	18.6	5.23	100	0.5	17.6	4.6	96	0.5	5%
101	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 3)	1	17.8	47.26	101	0.5	19.7	41.2	91	0.6	-10%
102	SDG&E-Risk-2-New 09	Strategic Pole Replacement Program (Non-HFTD)	51	17.6	5.43	102	0.5	10.5	4.7	108	0.3	40%
103	SDG&E-Risk-8-M2	Purchasing break/rest trailers with filtered air systems to reduce wildfire smoke exposure	1	16.6	169.35	103	0.5	18.3	147.6	93	0.5	-10%
104	SDG&E-RISK-3-C04-T01	Pipeline Relocation/Replacement - HCA	64	15.5	10.59	104	0.5	8.7	9.2	112	0.3	44%
105	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (HFTD Tier 3)	1	15.5	18.98	105	0.5	17.1	16.5	97	0.5	-10%
106	SDG&E-Risk-8-C15	Enhanced Employee Safe Driving Training	1	13.4	957.40	106	0.4	14.8	834.2	100	0.4	-10%
107	SDG&E-RISK-3-C08	Compressor Stations - Capital	50	13.3	24.49	107	0.4	8.0	21.3	114	0.2	40%
108	SDG&E-RISK-9-M03	Replace Curb Valves with EFVs	68	13.2	2.98	108	0.4	7.2	2.6	116	0.2	45%
109	SDG&E-RISK-7-M2	Automate Third Party Excavation Incident Reporting	5	12.7	0.01	109	0.4	13.0	0.0	103	0.4	-2%
110	SDG&E-RISK-3-M02-T01	Gas Transmission Safety Rule - MAOP Reconfirmation - HCA	8.71	12.7	80.99	110	0.4	12.1	71.3	106	0.4	5%
111	SDG&E-RISK-9-C06 T1	Leak Repair	68	12.4	26.92	111	0.4	6.8	23.4	117	0.2	45%
112	SDG&E-RISK-3-New-FIMP-Dist	NEW - Facility Integrity Management (FIMP)- Distribution	2.5	11.4	1.10	112	0.3	12.2	1.0	105	0.4	-7%
113	SDG&E-RISK-3-C03-T01	Leak Repair - HCA	64	11.4	2.42	113	0.3	6.4	2.1	118	0.2	44%
114	SDG&E-RISK-7-M1	Automate Third Party Excavation Incident Reporting	5	9.4	0.05	114	0.3	9.6	0.0	109	0.3	-2%
115	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 2)	1	8.0	4.73	115	0.2	8.8	4.1	110	0.3	-10%
116	SDG&E-RISK-3-C12	Odorization	1	8.0	0.01	116	0.2	8.8	0.0	111	0.3	-11%

117	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (HFTD Tier 2)	1	7.7	4.74	117	0.2	8.5	4.1	113	0.2	-10%
118	SDG&E-Risk-2-C3	4kV Modernization Program – Distribution	55	6.8	19.30	118	0.2	4.0	16.8	120	0.1	42%
119	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 2)	1	6.7	26.97	119	0.2	7.4	23.5	115	0.2	-10%
120	SDG&E-RISK-3-C10-T01	Measurement & Regulation Station – Capital - HCA	46	6.3	2.98	120	0.2	3.9	2.6	121	0.1	38%
121	SDG&E-Risk-2-C1	Overhead Public Safety (OPS) Program	55	6.1	24.08	121	0.2	3.6	21.0	122	0.1	42%
122	SDG&E-RISK-9-C08-T03	Underperforming Steel Replacement Program – Other Steel (Post 1965 vintage)	68	5.4	9.54	122	0.2	3.0	8.3	123	0.1	45%
123	SDG&E-RISK-7-C03	Locate and Mark Activities*	1	4.8	13.91	123	0.1	5.3	12.1	119	0.2	-11%
124	SDG&E-Risk-2-C13	Replacement of Live Front Equipment - Proactive	57	4.6	2.48	124	0.1	2.7	2.2	124	0.1	42%
125	SDG&E-RISK-9-C03	Piping in Vaults Replacement Program	40	3.7	5.05	125	0.1	2.4	4.4	125	0.1	35%
126	SDG&E-Risk-2-C20 -T2	Substation Reliability for Distribution Components – Bernardo 12kV Breakers Replacements	51	3.2	0.71	126	0.1	1.9	0.6	126	0.1	40%
127	SDG&E-RISK-9-C09-T03	Early Vintage Program (Components) - Removal of Closed Valves between High/Medium Pressure Zones	68	2.5	3.91	127	0.1	1.4	3.4	127	0.0	45%
128	SDG&E-Risk-2-C20-T5	Substation Reliability for Distribution Components – Miramar 12kV Replacements	51	2.2	1.07	128	0.1	1.3	0.9	128	0.0	40%
129	SDG&E-RISK-9-C08-T02	Underperforming Steel Replacement Program (1934-1965 vintage)	68	1.3	18.53	129	0.0	0.7	16.1	131	0.0	45%
130	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	1.3	13.98	130	0.0	1.1	12.2	130	0.0	13%
131	SDG&E-Risk-2-C20-T8	Substation Reliability for Distribution Components – Coronado 69/12kV Transformer Replacements	51	1.1	1.70	131	0.0	0.7	1.5	134	0.0	40%
132	SDG&E-RISK-7-C09	Locate and Mark Quality Assurance	1	1.1	0.58	132	0.0	1.2	0.5	129	0.0	-11%
133	SDG&E-Risk-2-C21	Distribution Substation Obsolete Equipment	51	1.0	9.66	133	0.0	0.6	8.4	136	0.0	40%
134	SDG&E-Risk-2-New 01	Mission 12KV Replacements	51	0.9	3.01	134	0.0	0.5	2.6	140	0.0	40%
135	SDG&E-RISK-3-C10-T02	Measurement & Regulation Station – Capital - Non-HCA	46	0.9	0.66	135	0.0	0.5	0.6	138	0.0	38%
136	SDG&E-RISK-9-C10	Code Compliance Mitigation	40	0.9	9.33	136	0.0	0.6	8.1	137	0.0	35%
137	SDG&E-Risk-2-C15	GO165 Corrective Maintenance Program – Underground	45	0.7	45.25	137	0.0	0.4	39.4	142	0.0	38%
138	SDG&E-RISK-9-C09-T02	Early Vintage Program (Components) - Dresser Mechanical Coupling Removal	68	0.7	7.63	138	0.0	0.4	6.6	143	0.0	45%
139	SDG&E-RISK-3-C13	Security and Auxiliary Equipment	10	0.7	1.79	139	0.0	0.6	1.6	135	0.0	6%
140	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements	10	0.6	0.42	140	0.0	0.5	0.4	139	0.0	6%
141	SDG&E-RISK-9-C05	Regulator Station Replacement	47	0.6	3.80	141	0.0	0.4	3.3	145	0.0	39%
142	SDG&E-Risk-2-New 02	Stuart 12kV Transformer Replacement	51	0.5	1.17	142	0.0	0.3	1.0	146	0.0	40%
143	SDG&E-RISK-9-C14	Human Factors Mitigations - Operator Qualification Training and Certification	3	0.5	1.91	143	0.0	0.5	1.7	141	0.0	-6%
144	SDG&E-RISK-9-C08-T01	Underperforming Steel Replacement Program – Threaded Main (pre-1933 vintage)	68	0.4	24.20	144	0.0	0.2	21.1	147	0.0	45%
145	SDG&E-RISK-9-C01	Cathodic Protection Program - O&M	4	0.3	2.55	145	0.0	0.4	2.2	144	0.0	-4%
146	SDG&E-Risk-2-New 03	La Jolla 69/12kV Transformer Replacement	51	0.3	2.41	146	0.0	0.2	2.1	148	0.0	40%
147	SDG&E-RISK-9-C16-T01	DIMP – DREAMS – Vintage Integrity Plastic Plan (VIPP)	68	0.2	290.23	147	0.0	0.1	252.0	150	0.0	45%
148	SDG&E-RISK-9-C21	CSF Quality Assurance (QA) Program	5	0.1	0.39	148	0.0	0.1	0.3	149	0.0	-2%
149	SDG&E-Risk-2-C24	Urban Substation Rebuild	51	0.1	17.73	149	0.0	0.1	15.4	151	0.0	40%
150	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements - Base	10	0.0	6.30	150	0.0	0.0	5.5	152	0.0	6%
151	SDG&E-RISK-9-C19	Field and Public Safety	1	0.0	16.35	151	0.0	0.0	14.2	153	0.0	-11%
152	SDG&E-RISK-9-C20	Natural Gas Appliance Testing (NGAT) or Carbon Monoxide Testing	1	0.0	2.32	152	0.0	0.0	2.0	154	0.0	-10%
153	SDG&E-Risk-2-New 06	Substation Modification To Support FLISR	51	0.0	46.87	153	0.0	0.0	41.3	155	0.0	41%
154	SDG&E-Risk-2-New 05	San Marcos Substation 69kV Rebuild & 12kV Switchgear	51	0.0	130.66	154	0.0	0.0	116.0	156	0.0	41%
155	SDG&E-Risk-2-New 04	Poway 69kV Substation Rebuild	51	0.0	164.64	155	0.0	0.0	144.2	157	0.0	40%
156	SDG&E-Risk-2-C16	GO 165 Manhole, Vault Restoration Program	45	0.0	17.09	156	0.0	0.0	14.9	158	0.0	0%
157	SDG&E-Risk-2-C10-T3	Underground Cable Replacement Program (Proactive) – North Harbor Project	45	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
158	SDG&E-Risk-2-New 07	Torrey Pines 12kV Breaker Replacements	51	0.0	0.00	156	0.0	0.7	1.6	133	0.0	0%
159	SDG&E-Risk-2-New 08	El Cajon 12kV Breaker Replacements	51	0.0	0.00	156	0.0	0.7	1.6	132	0.0	0%
160	SDG&E-Risk-8-C14	Enhanced Safety in Action Program	1	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
161	SDG&E-Risk-1-C06/M1 T2	SCADA Capacitors - (HFTD Tier 3)	0	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
162	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 2)	15	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
163	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 2)	40	0.0	0.10	156	0.0	0.0	0.1	158	0.0	0%
164	SDG&E-Risk-1-C9/M4-T1	PSPS Sectionalizing (HFTD Tier 3)	20	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
165	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 3)	0	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
166	SDG&E-Risk-1-C27-T2	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 2)	0	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%

Table 3. Test Year (TY) RSE and B-C Ratio results for SCG under SCG's approach and TURN's approach (Sorted by RSE).

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra TY RSE w/ CFF	Cost (2021$ M)	Overall RSE rank	B/C Ratio	Revised TY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in
1	SCG-RISK-3-C09	Pipeline Monitoring (Bridge & Span)	1	693.3	0.1	1	20.4	624.9	0.1	1	18.4	10%
2	SCG-RISK-1-C01-T01	Cathodic Protection - Capital	64	588.6	2.6	2	17.3	292.1	2.6	8	8.6	50%
3	SCG-RISK-5-C10	Workplace Violence Prevention Programs	16	584.2	6.3	3	17.2	411.3	6.6	5	12.1	30%
4	SCG-RISK-1-C07-T01	Pipeline Maintenance	1	572.2	0.3	4	16.8	515.8	0.3	2	15.2	10%
5	SCG-RISK-3-C04	Meter & Regulator (M&R) Station and Electronic Pressure Monitors (EPM) Inspection and Maintenance	1	564.3	0.8	5	16.6	508.7	0.9	3	15.0	10%
6	SCG-RISK-1-C02-T01	Cathodic Protection - Maintenance	1	476.6	0.5	6	14.0	429.6	0.5	4	12.6	10%
7	SCG-RISK-3-C11	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	0.3	390.8	0.0	7	11.5	356.4	0.0	6	10.5	9%
8	SCG-RISK-1-C06-T01	Shallow/Exposed Pipe Remediations	64	347.8	1.3	8	10.2	172.6	1.3	13	5.1	50%
9	SCG-RISK-1-C04-T01	Leak Survey & Patrol	1	341.4	0.8	9	10.0	307.7	0.9	7	9.1	10%
10	SCG-RISK-1-C01-T02	Cathodic Protection - Capital	64	325.3	5.2	10	9.6	161.4	5.2	14	4.7	50%
11	SCG-RISK-1-C07-T02	Pipeline Maintenance	1	299.4	0.6	11	8.8	269.9	0.7	9	7.9	10%
12	SCG-RISK-1-C13-T01	Measurement & Regulation Station - Maintenance	46	266.2	0.8	12	7.8	135.8	0.8	15	4.0	49%
13	SCG-RISK-1-C02-T02	Cathodic Protection - Maintenance	1	250.3	1.0	13	7.4	225.6	1.1	10	6.6	10%
14	SCG-RISK-3-C10	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	1	234.4	0.1	14	6.9	211.3	0.1	11	6.2	10%
15	SCG-RISK-1-C06-T02	Shallow/Exposed Pipe Remediations	64	212.6	2.6	15	6.3	105.5	2.6	18	3.1	50%
16	SCG-RISK-3-C07	EPM Installations & Replacements	10	209.6	0.3	16	6.2	173.5	0.3	12	5.1	17%
17	SCG-RISK-5-M07	Workplace Violence Prevention Program Enhancements	5	159.6	0.1	17	4.7	134.3	0.1	16	4.0	16%
18	SCG-RISK-2-C06	Locate and Mark Annual Refresher Training and Competency Program (HP)	1	143.6	0.0	18	4.2	126.7	0.0	17	3.7	12%
19	SCG-RISK-1-C13-T02	Measurement & Regulation Station - Maintenance	46	139.9	1.6	19	4.1	71.4	1.7	26	2.1	49%
20	SCG-RISK-3-C06	Meter Set Assembly (MSA) Inspection and Maintenance	10	116.7	1.6	20	3.4	89.4	1.7	22	2.6	23%
21	SCG-RISK-2-M2	Automate Third Party Excavation Incident Reporting	5	113.7	0.0	21	3.3	93.3	0.0	20	2.7	18%
22	SCG-RISK-4-C05 - T3	Storage Field Maintenance - Underground Components	1	104.0	5.5	22	3.1	104.0	5.2	19	3.1	0%
23	SCG-RISK-3-C20	DIMP: Distribution Riser Inspection Project (DRIP)	67	103.4	26.8	23	3.0	46.9	28.7	31	1.4	55%
24	SCG-RISK-2-C16-T01/T02/T03/T04	Public Awareness	1	102.9	0.1	24	3.0	90.4	0.2	21	2.7	12%
25	SCG-RISK-3-C05	Regulator Station Installation & Replacement	47	101.9	0.3	25	3.0	55.6	0.3	30	1.6	45%
26	SCG-RISK-1-C04-T02	Leak Survey & Patrol	1	96.5	1.7	26	2.8	87.0	1.8	23	2.6	10%
27	SCG-RISK-2-C04	Locate & Mark Activities (HP)	1	87.3	5.4	27	2.6	77.5	5.9	24	2.3	11%
28	SCG-RISK-1-C22-T04.3	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	84.7	4.2	28	2.5	46.5	4.2	32	1.4	45%
29	SCG-RISK-2-M1	Automate Third Party Excavation Incident Reporting	5	78.0	0.1	29	2.3	72.5	0.1	25	2.1	7%
30	SCG-RISK-7-C01	Contractor Safety Oversight	1	70.3	0.3	30	2.1	63.7	0.3	27	1.9	9%
31	SCG-RISK-3-C12	Valve Inspection & Maintenance	1	67.5	0.7	31	2.0	60.8	0.7	29	1.8	10%
32	SCG-RISK-2-C14	Locating Equipment (HP)	1	65.4	0.2	32	1.9	62.8	0.2	28	1.8	4%
33	SCG-RISK-1-C22-T03.2	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 2A, GRC base)	64	55.1	25.7	33	1.6	27.4	25.4	40	0.8	50%
34	SCG-RISK-2-C11	Damage Prevention Analyst Program	1	47.5	1.4	34	1.4	28.5	2.2	38	0.8	40%
35	SCG-RISK-5-C07	Near Miss, Stop the Job and Jobsite Safety Programs	1	46.4	0.3	35	1.4	42.1	0.4	33	1.2	9%
36	SCG-RISK-5-M06	Industrial Hygiene Program Expansion	1	44.2	0.2	36	1.3	40.1	0.2	34	1.2	9%

37	SCG-RISK-2-C26	Pipeline Patrol and Pipeline Markers	1	41.1	0.5	37	1.2	36.1	0.6	35	1.1	12%
38	SCG-RISK-3-C12	Valve Inspections and Maintenance	1	35.6	0.5	38	1.0	32.0	0.6	36	0.9	10%
39	SCG-RISK-1-C09-T01	Class Location (Hydrotest) - Maintenance	7	34.5	0.3	39	1.0	27.9	0.3	39	0.8	19%
40	SCG-RISK-2-C12	Damage Prevention Analyst Program	1	33.2	0.3	40	1.0	30.4	0.4	37	0.9	8%
41	SCG-RISK-3-C22	DIMP: Gas Infrastructure Protection Project (GIPP)- Medium Pressure and High pressure	40	32.5	18.4	41	1.0	18.7	18.3	49	0.6	42%
42	SCG-RISK-5-C02	Drug and Alcohol Testing Programs	1	29.6	0.3	42	0.9	26.9	0.3	41	0.8	9%
43	SCG-RISK-5-C04	Employee Safety Training and Awareness Programs	1	28.6	0.7	43	0.8	25.9	0.8	42	0.8	9%
44	SCG-RISK-3-C18	Residential Meter Protection	40	26.8	12.9	44	0.8	15.5	12.8	52	0.5	42%
45	SCG-RISK-3-C03	Cathodic Protection- 100mV Requalification	10	25.8	1.4	45	0.8	19.8	1.5	47	0.6	23%
46	SCG-RISK-7-C03	Contractor Engagement	1	24.8	0.1	46	0.7	22.5	0.1	43	0.7	9%
47	SCG-RISK-5-M04	Creation of a Safety Video Library	1	24.5	0.1	47	0.7	22.2	0.1	44	0.7	9%
48	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	24.1	1.3	48	0.7	21.7	1.4	45	0.6	10%
49	SCG-RISK-2-C15-T01/T02/T03/T04	Public Awareness	1	22.4	0.6	49	0.7	20.1	0.7	46	0.6	10%
50	SCG-RISK-3-C04 T2	Meter and Regulator (M&R) Station Maintenance + Electronic Pressure Monitor (EPM) Maintenance	1	21.3	3.9	50	0.6	19.2	4.2	48	0.6	10%
51	SCG-RISK-2-C05	Locate and Mark Annual Refresher Training and Competency Program (MP)	1	19.5	0.1	51	0.6	15.8	0.1	51	0.5	19%
52	SCG-RISK-5-C05	Safe Driving Programs	1	18.2	1.0	52	0.5	16.5	1.1	50	0.5	9%
53	SCG-RISK-1-C09-T02	Class Location (Hydrotest) - Maintenance	7	17.8	0.5	53	0.5	14.4	0.6	53	0.4	19%
54	SCG-RISK-1-C22-T04.4	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	15.5	5.5	54	0.5	8.5	5.4	64	0.3	45%
55	SCG-RISK-1-C03-T01	Leak Repair	64	15.3	3.9	55	0.4	7.6	3.8	65	0.2	50%
56	SCG-RISK-7-C02	Third-Party Administration Tools	1	15.0	0.3	56	0.4	13.6	0.4	54	0.4	9%
57	SCG-RISK-3-C07	EPM Replacements & Installs	10	14.1	0.5	57	0.4	11.6	0.5	57	0.3	17%
58	SCG-RISK-1-New-FIMP-Dist	NEW - Facility Integrity Management Program (FIMP) - Distribution	2.5	13.9	1.7	58	0.4	12.6	1.8	55	0.4	9%
59	SCG-RISK-3-C10	Pipeline Monitoring (Bridge & Span)	1	12.8	0.1	59	0.4	11.5	0.1	58	0.3	10%
60	SCG-RISK-2-C03	Locate and Mark Activities (MP)	1	12.5	23.3	60	0.4	12.4	22.5	56	0.4	0%
61	SCG-RISK-3-C30	MSA Inspection Program	3	11.9	28.7	61	0.3	10.3	30.7	59	0.3	13%
62	SCG-RISK-5-C08	Safety Culture Programs	1	10.8	0.7	62	0.3	9.8	0.7	60	0.3	9%
63	SCG-RISK-1-M01-T02	Gas Transmission Safety Rule - MAOP Reconfirmation	9	10.2	25.5	63	0.3	8.7	25.2	63	0.3	15%
64	SCG-RISK-5-M03	Proactive Monitoring and Indoor Air Quality and Chemicals of Concern	1	10.2	0.1	64	0.3	9.3	0.1	61	0.3	9%
65	SCG-RISK-1-C03-T02	Leak Repair	64	8.9	7.9	65	0.3	4.4	7.8	69	0.1	50%
66	SCG-RISK-4-C05 - T2	Storage Field Maintenance - Aboveground Piping	1	8.8	4.3	66	0.3	8.8	4.1	62	0.3	0%
67	SCG-RISK-1-C15	Security and Auxiliary Equipment	10	5.9	0.8	67	0.2	4.8	0.8	66	0.1	17%
68	SCG-RISK-3-C08/C17	Leak Survey and Main & Service Leak Repair	3	5.6	23.1	68	0.2	4.8	24.7	68	0.1	14%
69	SCG-RISK-3-C02	Cathodic Protection- CP10 Activities	10	5.5	2.4	69	0.2	4.2	2.6	71	0.1	23%
70	SCG-RISK-2-C32	Ticket Risk Assessment, and evaluating City permit data	1	5.5	0.1	70	0.2	4.8	0.1	67	0.1	12%
71	SCG-RISK-5-C03	Employee Wellness Programs	1	4.8	1.2	71	0.14	4.3	1.3	70	0.1	9%
72	SCG-RISK-1-C21-T01	Integrity Assessments & Remediation	7	4.1	183.7	72	0.12	3.5	189.0	74	0.1	16%
73	SCG-RISK-1-C22-T02.4	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 1B, GRC base)	64	4.0	22.3	73	0.12	2.0	22.0	80	0.1	50%
74	SCG-RISK-5-C09	Utilizing Industry Best Practices and Benchmarking	1	3.9	1.1	74	0.11	3.5	1.2	73	0.1	9%
75	SCG-RISK-4-C01	Integrity Demonstration, Verification, and Monitoring Practices	2	3.9	54.9	75	0.11	3.9	50.7	72	0.1	-2%
76	SCG-RISK-1-C08-T01	Right of Way	1	3.7	0.8	76	0.11	3.3	0.8	75	0.1	10%
77	SCG-RISK-3-C05	Regulator Station Replacements/Installs	47	3.4	3.1	77	0.10	1.9	3.1	81	0.1	45%
78	SCG-RISK-1-C11	Compressor Station - Maintenance	1	3.0	13.4	78	0.09	2.7	14.3	76	0.1	10%
79	SCG-RISK-1-M01-T01	Gas Transmission Safety Rule - MAOP Reconfirmation	9	2.9	83.0	79	0.09	2.5	82.1	78	0.1	15%
80	SCG-RISK-1-C20	Facility Integrity Management Program (FIMP) - Transmission	2.5	2.8	3.9	80	0.08	2.5	4.1	77	0.1	9%
81	SCG-RISK-3-C13	Valve Installs and Replacements	47	2.3	1.0	81	0.07	1.3	1.0	87	0.04	45%
82	SCG-RISK-4-C02	Well Abandonment and Replacement	2	2.3	57.4	82	0.07	2.5	50.8	79	0.1	-7%
83	SCG-RISK-1-C21-T02	Integrity Assessments & Remediation	10	2.3	152.4	83	0.07	1.8	156.7	83	0.1	20%
84	SCG-RISK-3-C13	Valve Installs and Replacements	47	2.1	0.7	84	0.06	1.1	0.7	89	0.03	45%
85	SCG-RISK-1-C10	Compressor Stations - Capital	50	2.1	11.2	85	0.06	1.1	11.1	90	0.03	46%
86	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	2.0	15.5	86	0.06	1.8	16.5	82	0.05	10%
87	SCG-RISK-3-C14	Cathodic Protection- Install / Replace Impressed Current Systems	20	2.0	0.6	87	0.06	1.4	0.6	86	0.04	29%
88	SCG-RISK-1-C12-T01	Measurement & Regulation - Capital	46	2.0	12.9	88	0.06	1.1	12.8	91	0.03	45%
89	SCG-RISK-1-C08-T02	Right of Way	1	1.9	1.6	89	0.06	1.7	1.7	84	0.05	10%
90	SCG-RISK-1-C22-T03.4	Pipeline Safety Enhancement Plan - Hydrotesting (Phase 2A, GRC base)	7	1.9	79.0	90	0.06	1.5	84.3	85	0.05	19%
91	SCG-RISK-1-C05-T01	Pipeline Relocation/Replacement - Capital	64	1.9	7.7	91	0.06	0.9	7.7	92	0.03	50%
92	SCG-RISK-3-C14	Cathodic Protection – Install/Replace Impressed Current Systems	20	1.8	6.7	92	0.05	1.3	6.6	88	0.04	29%
93	SCG-RISK-1-C12-T02	Measurement & Regulation - Capital	46	1.1	26.2	93	0.03	0.6	25.9	96	0.02	45%
94	SCG-RISK-1-C05-T02	Pipeline Relocation/Replacement - Capital	64	1.0	15.7	94	0.03	0.5	15.6	97	0.02	50%
95	SCG-RISK-3-C23	DIMP: Sewer Lateral Inspection Project (SLIP)	67	0.9	22.6	95	0.03	0.4	24.2	100	0.01	55%
96	SCG-RISK-4-M1	Facility Integrity Management Program (FIMP)	3	0.9	13.8	96	0.03	0.9	12.7	93	0.03	-1%
97	SCG-RISK-3-C32	Safety Related Field Orders	1	0.7	99.2	97	0.02	0.7	98.2	94	0.02	3%
98	SCG-RISK-4-C06	Compressor Overhauls	5	0.6	17.1	98	0.02	0.7	15.1	95	0.02	-1%
99	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.6	26.2	99	0.02	0.3	26.0	102	0.009	51%
100	SCG-RISK-3-C28	Quality Assurance Program	5	0.5	1.3	100	0.02	0.4	1.3	99	0.013	17%
101	SCG-RISK-4-C05 - T1	Storage Field Maintenance - Aboveground Facilities	1	0.5	43.1	101	0.01	0.5	41.5	98	0.014	0%
102	SCG-RISK-3-C19-T1	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.4	2.5	102	0.01	0.2	2.5	106	0.006	51%
103	SCG-RISK-5-M02	Industrial Hygiene Program Refresh	1	0.3	1.0	103	0.01	0.3	1.0	101	0.009	9%
104	Ventura Principal	Ventura Principal	35	0.3	33.8	104	0.01	0.2	33.4	107	0.006	40%
105	SCG-RISK-3-C08/C17	Leak Survey	3	0.3	3.5	105	0.009	0.3	3.7	103	0.008	14%
106	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	10	0.3	0.2	106	0.007	0.2	0.2	105	0.006	17%
107	SCG-RISK-3-C21-T1	DIMP: DREAMS- Vintage Integrity Plastic Plan (VIPP)	68	0.3	219.3	107	0.007	0.1	217.2	108	0.004	51%
108	SCG-RISK-2-C13	Locating Equipment (MP)	5	0.2	0.7	108	0.006	0.2	0.6	104	0.006	-1%
109	SCG-RISK-3-C19 T2	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.2	16.6	109	0.006	0.1	16.4	109	0.003	51%
110	SCG-RISK-3-C19 T3	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.1	0.6	110	0.004	0.1	0.6	112	0.002	51%
111	SCG-RISK-3-C21-T2	DIMP: DREAMS- Bare Steel Replacement Program (BSRP)	68	0.1	32.2	111	0.004	0.1	31.8	113	0.002	51%
112	SCG-RISK-3-C33	Natural Gas Appliance Testing	1	0.1	4.0	112	0.003	0.1	4.3	110	0.003	10%
113	SCG-RISK-1-C14	Odorization	1	0.1	0.8	113	0.003	0.1	0.8	111	0.002	3%
114	SCG-RISK-3-C25	Field Employee Skills Training	5	0.1	8.1	114	0.002	0.0	8.7	115	0.001	17%
115	SCG-RISK-4-C07	Upgrade to Purification Equipment	1	0.0	12.6	115	0.001	0.1	11.2	114	0.002	-9%
116	HR Prin	HR Prin	35	0.0	126.3	116	0.001	0.0	111.7	116	0.0	33%
117	SCG-RISK-1-C23-T1	Blythe Compressor Station Modernization	35	0.0	0.0	117	0.0	0.0	0.0	117	0.0	0%
118	Ventura ARE	Ventura ARE	35	0.0	0.0	117	0.0	0.0	0.0	117	0.0	0%

Table 4. Post Test Year (PTY) RSE and B-C Ratio results for SCG under SCG's approach and TURN's approach (Sorted by RSE).

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Post Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra PTY RSE w/ CFF	Cost (Nominal$ M)	Overall RSE rank	B/C Ratio	Revised PTY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in RSE
1	SCG-RISK-3-C09	Pipeline Monitoring (Bridge & Span)	1	554.5	0.1	1	16.3	611.7	0.1	1	18.0	-10%
2	SCG-RISK-3-C04	Meter & Regulator (M&R) Station and Electronic Pressure Monitors (EPM) Inspection and Maintenance	1	452.5	1.0	2	13.3	499.2	0.9	2	14.7	-10%
3	SCG-RISK-5-C10	Workplace Violence Prevention Programs	16	428.3	7.3	3	12.6	359.0	6.5	4	10.6	16%
4	SCG-RISK-1-C01-T01	Cathodic Protection - Capital	64	391.2	10.0	4	11.5	220.4	8.7	8	6.5	44%
5	SCG-RISK-1-C02-T01	Cathodic Protection - Maintenance	1	326.3	0.6	5	9.6	359.9	0.5	3	10.6	-10%
6	SCG-RISK-3-C11	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	0.25	312.8	0.0	6	9.2	343.9	0.0	5	10.1	-10%
7	SCG-RISK-1-C04-T01	Leak Survey & Patrol	1	240.0	1.0	7	7.1	264.7	0.9	6	7.8	-10%
8	SCG-RISK-1-C01-T02	Cathodic Protection - Capital	64	229.9	20.2	8	6.8	129.5	17.6	13	3.8	44%

9	SCG-RISK-5-M07	Workplace Violence Prevention Program Enhancements	5	223.3	0.1	9	6.6	223.7	0.0	7	6.6	0%
10	SCG-RISK-3-C07	EPM Installations & Replacements	10	210.1	0.8	10	6.2	197.4	0.7	11	5.8	6%
11	SCG-RISK-1-C06-T01	Shallow/Exposed Pipe Remediations	64	199.4	4.6	11	5.9	112.3	4.0	16	3.3	44%
12	SCG-RISK-3-C10	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	1	188.6	0.1	12	5.5	208.0	0.1	9	6.1	-10%
13	SCG-RISK-1-C02-T02	Cathodic Protection - Maintenance	1	184.1	1.3	13	5.4	203.0	1.1	10	6.0	-10%
14	SCG-RISK-1-C13-T01	Measurement & Regulation Station - Maintenance	46	182.2	1.0	14	5.4	113.8	0.8	14	3.3	38%
15	SCG-RISK-1-C07-T01	Pipeline Maintenance	1	149.2	1.0	15	4.4	164.5	0.9	12	4.8	-10%
16	SCG-RISK-1-C06-T02	Shallow/Exposed Pipe Remediations	64	128.8	9.3	16	3.8	72.6	8.1	22	2.1	44%
17	SCG-RISK-3-C05	Regulator Station Installation & Replacement	47	105.1	0.2	17	3.1	65.1	0.2	24	1.9	38%
18	SCG-RISK-2-C06	Locate and Mark Annual Refresher Training and Competency Program (HP)	1	104.5	0.0	18	3.1	113.3	0.0	15	3.3	-8%
19	SCG-RISK-1-C13-T02	Measurement & Regulation Station - Maintenance	46	102.9	2.0	19	3.0	64.2	1.7	25	1.9	38%
20	SCG-RISK-3-C06	Meter Set Assembly (MSA) Inspection and Maintenance	10	84.0	2.0	20	2.5	77.6	1.8	20	2.3	8%
21	SCG-RISK-1-C07-T02	Pipeline Maintenance	1	83.8	2.1	21	2.5	92.5	1.8	17	2.7	-10%
22	SCG-RISK-2-C16-T01/T02/T03/T04	Public Awareness	1	82.4	0.2	22	2.4	89.3	0.2	18	2.6	-8%
23	SCG-RISK-1-C04-T02	Leak Survey & Patrol	1	71.2	2.1	23	2.1	78.5	1.8	19	2.3	-10%
24	SCG-RISK-2-C04	Locate & Mark Activities (HP)	1	69.9	6.8	24	2.1	75.8	6.0	21	2.2	-8%
25	SCG-RISK-2-M1	Automate Third Party Excavation Incident Reporting	5	62.8	0.1	25	1.8	63.1	0.1	26	1.9	-1%
26	SCG-RISK-7-C01	Contractor Safety Oversight	1	61.3	0.3	26	1.8	66.2	0.3	23	1.9	-8%
27	SCG-RISK-3-C12	Valve Inspection & Maintenance	1	54.1	0.8	27	1.6	59.7	0.7	27	1.8	-10%
28	SCG-RISK-3-C20	DIMP: Distribution Riser Inspection Project (DRIP)	67	47.8	87.3	28	1.4	26.0	77.7	38	0.8	45%
29	SCG-RISK-2-C11	Damage Prevention Analyst Program	1	38.2	1.7	29	1.1	41.4	1.5	28	1.2	-8%
30	SCG-RISK-2-C15-T01/T02/T03/T04	Public Awareness	1	35.8	0.4	30	1.1	38.7	0.3	29	1.1	-8%
31	SCG-RISK-2-M2	Automate Third Party Excavation Incident Reporting	5	34.9	0.1	31	1.0	35.0	0.1	33	1.0	0%
32	SCG-RISK-5-C07	Near Miss, Stop the Job and Jobsite Safety Programs	1	34.1	0.4	32	1.0	36.8	0.3	30	1.1	-8%
33	SCG-RISK-5-M06	Industrial Hygiene Program Expansion	1	33.0	0.2	33	1.0	35.6	0.2	32	1.0	-8%
34	SCG-RISK-2-C26	Pipeline Patrol and Pipeline Markers	1	32.9	0.6	34	1.0	35.6	0.6	31	1.0	-8%
35	SCG-RISK-4-C05 - T3	Storage Field Maintenance - Underground Components	1	32.4	17.0	35	1.0	35.0	15.2	34	1.0	-8%
36	SCG-RISK-3-C12	Valve Inspections and Maintenance	1	28.5	0.7	36	0.8	30.9	0.6	35	0.9	-8%
37	SCG-RISK-1-C22-T03.2	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 2A, GRC base)	64	27.0	45.1	37	0.8	15.2	39.4	47	0.4	44%
38	SCG-RISK-1-C09-T01	Class Location (Hydrotest) - Maintenance	7	27.0	0.9	38	0.8	26.7	0.7	37	0.8	1%
39	SCG-RISK-2-C12	Damage Prevention Analyst Program	1	26.6	0.4	39	0.8	28.8	0.4	36	0.8	-8%
40	SCG-RISK-3-C18	Residential Meter Protection	40	23.4	28.3	40	0.7	15.0	25.2	48	0.4	36%
41	SCG-RISK-5-C02	Drug and Alcohol Testing Programs	1	21.8	0.4	41	0.6	23.5	0.3	39	0.7	-8%
42	SCG-RISK-7-C03	Contractor Engagement	1	21.6	0.1	42	0.6	23.3	0.1	40	0.7	-8%
43	SCG-RISK-5-C04	Employee Safety Training and Awareness Programs	1	21.0	0.8	43	0.6	22.6	0.7	41	0.7	-8%
44	SCG-RISK-1-C03-T01	Leak Repair	64	20.8	6.9	44	0.6	11.7	6.0	54	0.3	44%
45	SCG-RISK-2-C14	Locating Equipment (HP)	1	19.6	0.6	45	0.6	21.1	0.5	43	0.6	-8%
46	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	19.3	1.7	46	0.6	21.3	1.5	42	0.6	-10%
47	SCG-RISK-3-C22	DIMP: Gas Infrastructure Protection Project (GIPP)- Medium Pressure and High pressure	40	18.4	53.9	47	0.5	11.8	48.0	53	0.3	36%
48	SCG-RISK-5-M04	Creation of a Safety Video Library	1	18.0	0.1	48	0.5	19.4	0.1	44	0.6	-8%
49	SCG-RISK-3-C04 T2	Meter and Regulator (M&R) Station Maintenance + Electronic Pressure Monitor (EPM) Maintenance	1	17.1	4.9	49	0.5	18.5	4.3	45	0.5	-8%
50	SCG-RISK-2-C05	Locate and Mark Annual Refresher Training and Competency Program (MP)	1	16.2	0.1	50	0.5	17.5	0.1	46	0.5	-8%
51	SCG-RISK-1-C09-T02	Class Location (Hydrotest) - Maintenance	7	15.0	1.8	51	0.4	14.8	1.5	49	0.4	1%
52	SCG-RISK-3-C03	Cathodic Protection- 100mV Requalification	10	14.8	1.7	52	0.4	13.7	1.5	51	0.4	8%
53	SCG-RISK-7-C02	Third-Party Administration Tools	1	13.1	0.4	53	0.4	14.1	0.3	50	0.4	-8%
54	SCG-RISK-3-C07	EPM Replacements & Installs	10	12.4	1.1	54	0.4	11.4	1.0	55	0.3	8%
55	SCG-RISK-1-C03-T02	Leak Repair	64	12.2	14.0	55	0.4	6.9	12.2	61	0.2	44%
56	SCG-RISK-5-C05	Safe Driving Programs	1	11.1	1.2	56	0.3	12.0	1.0	52	0.4	-8%
57	SCG-RISK-3-C10	Pipeline Monitoring (Bridge & Span)	1	10.2	0.1	57	0.3	11.1	0.1	56	0.3	-8%
58	SCG-RISK-2-C03	Locate and Mark Activities (MP)	1	10.0	29.0	58	0.3	10.9	25.7	57	0.3	-8%
59	SCG-RISK-3-C30	MSA Inspection Program	3	8.5	35.7	59	0.3	8.9	31.7	58	0.3	-4%
60	SCG-RISK-5-C08	Safety Culture Programs	1	8.0	0.8	60	0.2	8.6	0.7	59	0.3	-8%
61	SCG-RISK-5-M03	Proactive Monitoring and Indoor Air Quality and Chemicals of Concern	1	7.6	0.1	61	0.2	8.2	0.1	60	0.2	-8%
62	SCG-RISK-1-C20	Facility Integrity Management Program (FIMP) - Transmission	2.5	5.3	12.5	62	0.2	5.7	10.9	62	0.2	-7%
63	SCG-RISK-1-C21-T01	Integrity Assessments & Remediation	7	4.5	548.3	63	0.13	4.4	479.9	66	0.1	2%
64	SCG-RISK-3-C08/C17	Leak Survey and Main & Service Leak Repair	3.392115417	4.4	28.7	64	0.13	4.6	25.5	65	0.1	-4%
65	SCG-RISK-2-C32	Ticket Risk Assessment, and evaluating City permit data	1	4.4	0.1	65	0.13	4.8	0.1	63	0.1	-8%
66	SCG-RISK-1-New-FIMP-Dist	NEW - Facility Integrity Management Program (FIMP) - Distribution	2.5	4.4	5.4	66	0.13	4.7	4.7	64	0.1	-7%
67	SCG-RISK-1-C21-T02	Integrity Assessments & Remediation	10	4.2	404.7	67	0.12	3.9	353.4	67	0.1	6%
68	SCG-RISK-3-C02	Cathodic Protection- CP10 Activities	10	3.7	7.9	68	0.11	3.4	7.0	69	0.1	8%
69	SCG-RISK-5-C03	Employee Wellness Programs	1	3.5	1.4	69	0.10	3.8	1.3	68	0.1	-8%
70	SCG-RISK-3-C13	Valve Installs and Replacements	47	3.2	2.4	70	0.10	2.0	2.1	76	0.06	38%
71	SCG-RISK-1-M01-T02	Gas Transmission Safety Rule - MAOP Reconfirmation	8.71	3.2	127.7	71	0.09	3.1	111.2	72	0.09	4%
72	SCG-RISK-5-C09	Utilizing Industry Best Practices and Benchmarking	1	3.0	1.2	72	0.09	3.3	1.1	70	0.10	-8%
73	SCG-RISK-1-C08-T01	Right of Way	1	2.9	2.6	73	0.08	3.2	2.2	71	0.09	-10%
74	SCG-RISK-1-C22-T03.4	Pipeline Safety Enhancement Plan - Hydrotesting (Phase 2A, GRC base)	7	2.8	158.6	74	0.08	2.8	138.3	74	0.08	1%
75	SCG-RISK-4-C05 - T2	Storage Field Maintenance - Aboveground Piping	1	2.8	13.3	75	0.08	3.0	11.9	73	0.09	-8%
76	SCG-RISK-3-C05	Regulator Station Replacements/Installs	47	2.8	6.4	76	0.08	1.7	5.7	81	0.05	39%
77	SCG-RISK-3-C14	Cathodic Protection- Install / Replace Impressed Current Systems	20	2.5	1.4	77	0.07	2.0	1.2	77	0.06	19%
78	SCG-RISK-1-C22-T02.4	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 1B, GRC base)	64	2.5	125.8	78	0.07	1.4	109.7	84	0.04	44%
79	SCG-RISK-1-C11	Compressor Station - Maintenance	1	2.2	16.6	79	0.07	2.5	14.4	75	0.07	-10%
80	SCG-RISK-3-C13	Valve Installs and Replacements	47	2.1	2.6	80	0.06	1.3	2.3	85	0.04	39%
81	SCG-RISK-3-C14	Cathodic Protection – Install/Replace Impressed Current Systems	20	1.9	16.5	81	0.06	1.5	14.7	83	0.04	21%
82	SCG-RISK-4-C06	Compressor Overhauls	5	1.9	14.5	82	0.06	1.9	12.9	78	0.06	0%
83	SCG-RISK-3-C23	DIMP: Sewer Lateral Inspection Project (SLIP)	67	1.8	73.6	83	0.05	1.0	65.5	86	0.03	45%
84	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	1.6	19.3	84	0.05	1.8	17.1	79	0.05	-8%
85	SCG-RISK-1-C08-T02	Right of Way	1	1.6	5.2	85	0.05	1.8	4.6	80	0.05	-10%
86	SCG-RISK-1-C05-T01	Pipeline Relocation/Replacement - Capital	64	1.5	23.8	86	0.05	0.9	20.8	88	0.03	44%
87	SCG-RISK-4-C01	Integrity Demonstration, Verification, and Monitoring Practices	2	1.5	137.0	87	0.04	1.6	122.1	82	0.05	-6%
88	SCG-RISK-1-C12-T01	Measurement & Regulation - Capital	46	1.4	45.8	88	0.04	0.9	40.0	89	0.03	38%
89	SCG-RISK-1-C10	Compressor Stations - Capital	50	1.3	48.6	89	0.04	0.8	42.4	91	0.02	39%
90	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	1.1	82.8	90	0.03	0.6	73.7	92	0.02	46%
91	SCG-RISK-1-C15	Security and Auxiliary Equipment	10	1.0	13.5	91	0.03	0.9	11.8	87	0.03	6%
92	SCG-RISK-1-C05-T02	Pipeline Relocation/Replacement - Capital	64	0.9	48.5	92	0.03	0.5	42.3	96	0.02	44%
93	SCG-RISK-1-M01-T01	Gas Transmission Safety Rule - MAOP Reconfirmation	8.71	0.9	415.8	93	0.03	0.8	362.1	90	0.02	4%
94	SCG-RISK-1-C12-T02	Measurement & Regulation - Capital	46	0.8	93.0	94	0.02	0.5	81.1	97	0.02	38%
95	Ventura Principal	Ventura Principal	35	0.8	67.4	95	0.02	0.5	60.1	94	0.02	33%
96	SCG-RISK-4-C02	Well Abandonment and Replacement	2	0.5	178.1	96	0.02	0.6	158.7	93	0.02	-6%
97	SCG-RISK-2-C13	Locating Equipment (MP)	5	0.5	2.4	97	0.02	0.5	2.2	95	0.02	0%
98	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	10	0.4	0.3	98	0.012	0.4	0.3	98	0.011	6%
99	SCG-RISK-3-C28	Quality Assurance Program	5	0.4	1.6	99	0.011	0.4	1.4	99	0.011	-1%
100	SCG-RISK-3-C19-T1	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.3	9.1	100	0.010	0.2	7.9	104	0.006	45%
101	SCG-RISK-3-C08/C17	Leak Survey	3.392115417	0.3	4.3	101	0.007	0.3	3.8	101	0.008	-5%
102	SCG-RISK-5-M02	Industrial Hygiene Program Refresh	1	0.2	1.1	102	0.007	0.3	1.0	100	0.008	-8%
103	SCG-RISK-3-C21-T1	DIMP: DREAMS- Vintage Integrity Plastic Plan (VIPP)	68	0.2	720.0	103	0.007	0.1	641.0	106	0.004	46%
104	SCG-RISK-4-M1	Facility Integrity Management Program (FIMP)	2.5	0.2	42.5	104	0.007	0.2	37.8	102	0.007	-5%
105	SCG-RISK-3-C19 T3	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.2	2.1	105	0.006	0.1	1.9	107	0.003	46%
106	SCG-RISK-3-C32	Safety Related Field Orders	1	0.2	320.5	106	0.006	0.2	285.3	103	0.006	-8%
107	SCG-RISK-3-C19 T2	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.2	58.0	107	0.005	0.1	51.7	108	0.003	46%

108	HR Prin	HR Prin	35	0.1	397.5	108	0.004	0.1	361.9	109	0.003	35%
109	SCG-RISK-1-C23-T1	Blythe Compressor Station Modernization	35	0.1	132.3	109	0.004	0.1	115.4	110	0.003	32%
110	SCG-RISK-4-C05 - T1	Storage Field Maintenance - Aboveground Facilities	1	0.1	134.4	110	0.004	0.1	119.8	105	0.004	-8%
111	SCG-RISK-3-C21-T2	DIMP: DREAMS- Bare Steel Replacement Program (BSRP)	68	0.1	50.8	111	0.004	0.1	45.3	113	0.002	46%
112	SCG-RISK-3-C33	Natural Gas Appliance Testing	1	0.1	13.1	112	0.003	0.1	11.6	111	0.003	-8%
113	SCG-RISK-1-C14	Odorization	1	0.1	0.9	113	0.002	0.1	0.8	112	0.002	-10%
114	SCG-RISK-3-C25	Field Employee Skills Training	5	0.0	10.1	114	0.001	0.0	9.0	114	0.001	-1%
115	SCG-RISK-4-C07	Upgrade to Purification Equipment	1	0.0	23.8	115	0.001	0.0	21.3	115	0.001	-8%
116	SCG-RISK-1-C22-T04.3	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	0.0	0.0	116	0.00	0.0	0.0	116	0.00	0%
117	SCG-RISK-1-C22-T04.4	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	0.0	0.0	116	0.00	0.0	0.0	116	0.00	0%
118	Ventura ARE	Ventura ARE	35	0.0	0.0	116	0.00	0.0	0.0	116	0.00	0%

Table 5. Test Year (TY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by Risk)

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra TY RSE w/ CFF	Cost (2021$ M)	Overall RSE rank	B/C Ratio	Revised TY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in RSE
1	SDG&E-Risk-2-C1	Overhead Public Safety (OPS) Program	55	27.6	7.40	96	0.8	12.6	8.2	105	0.4	54%
2	SDG&E-Risk-2-C3	4kV Modernization Program – Distribution	55	24.7	7.17	98	0.7	11.3	8.0	106	0.3	54%
3	SDG&E-Risk-2-C4	Distribution Overhead Switch Replacement Program	55	251.5	0.91	34	7.4	115.1	1.0	51	3.4	54%
4	SDG&E-Risk-2-C6	Tree Trimming (non-HFTD)	1	39.3	19.91	83	1.2	35.2	21.3	76	1.0	10%
5	SDG&E-Risk-2-C8	Aviation Protection Program	55	35.9	1.71	89	1.1	16.4	1.9	97	0.5	54%
6	SDG&E-Risk-2-C10-T1-T2	Underground Cable Replacement Program (Proactive)	45	1898.4	3.76	5	55.8	927.0	4.2	6	27.3	51%
7	SDG&E-Risk-2-C10-T3	Underground Cable Replacement Program (Proactive) – North Harbor Project	45	1.0	8.51	136	0.03	0.5	9.5	138	0.01	51%
8	SDG&E-Risk-2-C11	Tee Modernization Program	57	1282.0	3.88	8	37.7	580.0	4.3	9	17.1	55%
9	SDG&E-Risk-2-C13	Replacement of Live Front Equipment - Proactive	57	17.3	0.77	106	0.5	7.8	0.9	109	0.2	55%
10	SDG&E-Risk-2-C14	DOE Switch Replacement – Underground	45	147.9	6.34	53	4.4	72.2	7.1	61	2.1	51%
11	SDG&E-Risk-2-C15	GO165 Corrective Maintenance Program – Underground	45	3.2	12.31	126	0.1	1.5	13.7	127	0.0	51%
12	SDG&E-Risk-2-C16	GO 165 Manhole, Vault Restoration Program	45	31.0	4.73	95	0.9	15.1	5.3	103	0.4	51%
13	SDG&E-Risk-2-C18 - T1	Distribution Circuit Reliability - Underground	45	455.9	2.71	19	13.4	222.6	3.0	27	6.5	51%
14	SDG&E-Risk-2-C18 -T2	Distribution Circuit Reliability - Overhead	45	461.5	1.81	17	13.6	225.3	2.0	26	6.6	51%
15	SDG&E-Risk-2-C20 -T2	Substation Reliability for Distribution Components – Bernardo 12kV Breakers Replacements	51	3.7	1.02	123	0.1	1.7	1.1	125	0.1	53%
16	SDG&E-Risk-2-C20-T5	Substation Reliability for Distribution Components – Miramar 12kV Replacements	51	36.8	0.11	87	1.1	17.2	0.1	95	0.5	53%
17	SDG&E-Risk-2-C20-T8	Substation Reliability for Distribution Components – Coronado 69/12kV Transformer Replacements	51	2.8	0.76	127	0.1	1.3	0.8	130	0.0	53%
18	SDG&E-Risk-2-C21	Distribution Substation Obsolete Equipment	51	0.9	2.31	139	0.0	0.4	2.6	139	0.0	53%
19	SDG&E-Risk-2-C24	Urban Substation Rebuild	51	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
20	SDG&E-Risk-2-C28	Field SCADA RTU Replacement	45	1037.1	0.69	10	30.5	506.4	0.8	11	14.9	51%
21	SDG&E-Risk-2-C29-T1	SCADA Capacitors - Overhead	12	83.7	0.76	64	2.5	59.5	0.8	62	1.7	29%
22	SDG&E-Risk-2-C29-T2	SCADA Capacitors - Undergroundf	12	62.3	0.32	68	1.8	44.3	0.4	73	1.3	29%
23	SDG&E-Risk-2-New 01	Mission 12KV Replacements	51	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
24	SDG&E-Risk-2-New 02	Stuart 12kV Transformer Replacement	51	1.1	0.95	134	0.0	0.5	1.1	137	0.0	53%
25	SDG&E-Risk-2-New 03	La Jolla 69/12kV Transformer Replacement	51	8.9	0.12	112	0.3	4.2	0.1	118	0.1	53%
26	SDG&E-Risk-2-New 04	Poway 69kV Substation Rebuild	51	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
27	SDG&E-Risk-2-New 05	San Marcos Substation 69kV Rebuild & 12kV Switchgear	51	5.0	0.11	120	0.1	2.3	0.1	122	0.1	53%
28	SDG&E-Risk-2-New 06	Substation Modification To Support FLISR	51	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
29	SDG&E-Risk-2-New 07	Torrey Pines 12kV Breaker Replacements	51	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
30	SDG&E-Risk-2-New 08	El Cajon 12kV Breaker Replacements	51	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
31	SDG&E-Risk-2-New 09	Strategic Pole Replacement Program (Non-HFTD)	51	288.1	6.57	31	8.5	135.0	7.3	44	4.0	53%
32	SDG&E-RISK-3-M04	Adobe Falls Relocation Project	64	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
33	SDG&E-RISK-3-C01-T01	Cathodic Protection - Capital - HCA	64	152.8	0.85	52	4.5	75.9	0.8	59	2.2	50%
34	SDG&E-RISK-3-C01-T02	Cathodic Protection - Capital - Non-HCA	64	49.4	0.19	78	1.5	24.5	0.2	86	0.7	50%
35	SDG&E-RISK-3-C02-T01	Cathodic Protection - Maintenance - HCA	1	3551.8	0.07	2	104.5	3184.7	0.1	1	93.7	10%
36	SDG&E-RISK-3-C02-T02	Cathodic Protection - Maintenance - Non-HCA	1	1512.0	0.02	7	44.5	1355.8	0.0	5	39.9	10%
37	SDG&E-RISK-3-C09	Compressor Station - Maintenance	1	6.4	3.37	119	0.2	5.7	3.6	115	0.2	10%
38	SDG&E-RISK-3-C08	Compressor Stations - Capital	50	3.3	7.11	125	0.1	1.8	7.0	124	0.1	46%
39	SDG&E-RISK-3-M02-T01	Gas Transmission Safety Rule - MAOP Reconfirmation - HCA	8.71	5.0	26.93	121	0.1	4.0	27.8	119	0.1	19%
40	SDG&E-RISK-3-M02-T02	Gas Transmission Safety Rule - MAOP Reconfirmation - Non-HCA	8.71	7.0	1.74	117	0.2	5.7	1.8	114	0.2	19%
41	SDG&E-RISK-3-C15-T01	Integrity Assessments & Remediation - HCA	7	18.3	19.36	105	0.5	15.3	20.0	102	0.4	16%
42	SDG&E-RISK-3-C15-T02	Integrity Assessments & Remediation - Non-HCA	10	8.5	1.02	114	0.2	6.7	1.1	112	0.2	21%
43	SDG&E-RISK-3-C03-T01	Leak Repair - HCA	64	21.1	0.89	100	0.6	10.5	0.9	107	0.3	50%
44	SDG&E-RISK-3-C03-T02	Leak Repair - Non-HCA	64	31.2	0.20	94	0.9	15.5	0.2	100	0.5	50%
45	SDG&E-RISK-3-C10-T01	Measurement & Regulation Station – Capital - HCA	46	9.2	0.73	111	0.3	5.1	0.7	116	0.1	45%
46	SDG&E-RISK-3-C10-T02	Measurement & Regulation Station – Capital - Non-HCA	46	1.3	0.16	131	0.0	0.7	0.2	132	0.0	45%
47	SDG&E-RISK-3-C11-T01	Measurement & Regulation Station – Maintenance - HCA	46	685.1	0.31	14	20.2	347.6	0.3	18	10.2	49%
48	SDG&E-RISK-3-C11-T02	Measurement & Regulation Station – Maintenance Non-HCA	46	292.7	0.07	30	8.6	148.5	0.1	38	4.4	49%
49	SDG&E-RISK-3-C12	Odorization	1	1.9	0.01	129	0.1	1.7	0.0	126	0.0	10%
50	SDG&E-RISK-3-C06-T01	Pipeline Maintenance - HCA	1	335.0	0.54	27	9.9	300.4	0.6	21	8.8	10%
51	SDG&E-RISK-3-C06-T02	Pipeline Maintenance - Non-HCA	1	144.3	0.12	54	4.2	129.4	0.1	48	3.8	10%
52	SDG&E-RISK-3-C04-T01	Pipeline Relocation/Replacement - HCA	64	42.8	0.44	81	1.3	21.3	0.4	88	0.6	50%
53	SDG&E-RISK-3-C04-T02	Pipeline Relocation/Replacement - Non-HCA	64	88.7	0.10	62	2.6	44.1	0.1	74	1.3	50%
54	SDG&E-RISK-3-C13	Security and Auxiliary Equipment	10	3.5	0.25	124	0.1	2.9	0.2	121	0.1	17%
55	SDG&E-RISK-3-C05-T01	Shallow/Exposed Pipe Remediations - HCA	64	4896.9	0.44	1	144.0	2431.1	0.4	2	71.5	50%
56	SDG&E-RISK-3-C05-T02	Shallow/Exposed Pipe Remediations - Non-HCA	64	190.9	0.10	43	5.6	94.8	0.1	55	2.8	50%
57	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	42.2	0.26	82	1.2	32.3	0.3	79	1.0	23%
58	SDG&E-RISK-9-C05	Reg Station Replacement Program	47	85.0	0.71	63	2.5	46.4	0.7	71	1.4	45%
59	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements	10	0.4	0.12	144	0.0	0.3	0.1	143	0.0	17%
60	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	1	333.1	0.09	28	9.8	298.7	0.1	22	8.8	10%
61	SDG&E-RISK-9-C01	Cathodic Protection - O&M	4.1	14.9	0.11	108	0.4	12.6	0.1	104	0.4	15%
62	Moreno Principal	Moreno Principal	35	1.0	178.25	137	0.0	0.6	176.4	133	0.0	40%
63	SDG&E-RISK-3-New-FIMP-Dist	NEW - Facility Integrity Management (FIMP)- Distribution	2.5	18.4	0.34	104	0.5	16.7	0.4	96	0.5	9%
64	SDG&E-RISK-3-New-FIMP-Trans	NEW - Facility Integrity Management (FIMP)- Transmission	2.5	33.8	0.09	92	1.0	30.7	0.1	81	0.9	9%
65	SDG&E-Risk-4-C1	Contractor Oversight Program	1	281.2	1.08	32	8.3	253.2	1.1	24	7.4	10%
66	SDG&E-Risk-4-C2	Field Safety Oversight	1	59.6	6.35	72	1.8	52.6	6.9	67	1.5	12%
67	SDG&E-Risk-4-M2	Enhanced Verification of Class 1 Contractor Employee Specific Training	1	108.8	0.35	59	3.2	94.0	0.4	56	2.8	14%
68	SDG&E-RISK-7-C16-T1/T2/T3/T4	Public Awareness	1	108.3	0.03	60	3.2	97.1	0.0	54	2.9	10%
69	SDG&E-RISK-7-C04	Locate & Mark Activities (HP)	1	444.4	0.29	20	13.1	398.5	0.3	15	11.7	10%
70	SDG&E-RISK-7-C12	Damage Prevention Analyst Program	1	52.8	0.02	77	1.6	47.3	0.0	70	1.4	10%
71	SDG&E-RISK-7-M2	Automate Third Party Excavation Incident Reporting	5	43.6	0.00	80	1.3	36.3	0.0	75	1.1	17%
72	SDG&E-RISK-7-M1	Automate Third Party Excavation Incident Reporting	5	32.1	0.02	93	0.9	26.7	0.0	85	0.8	17%
73	SDG&E-RISK-7-C11	Damage Prevention Analyst Program	1	110.9	0.09	58	3.3	99.4	0.1	53	2.9	10%
74	SDG&E-RISK-7-C03	Locate and Mark Activities*	1	6.5	10.23	118	0.2	5.8	11.0	113	0.2	10%
75	SDG&E-RISK-7-C09	Locate and Mark Quality Assurance	1	1.5	0.43	130	0.0	1.3	0.5	129	0.0	10%
76	SDG&E-RISK-7-C13	Locating Equipment	5	166.6	0.24	47	4.9	150.3	0.2	37	4.4	10%
77	SDG&E-RISK-7-C15-T1/T2/T3/T4	Public Awareness	1	55.9	0.17	75	1.6	50.2	0.2	69	1.5	10%
78	SDG&E-Risk-8-C3	Strong Safety Culture	1	376.3	0.24	23	11.1	352.0	0.2	17	10.4	6%
79	SDG&E-Risk-8-C4	Employee Behavioral Accident Prevention Process Program	1	122.3	0.49	56	3.6	114.4	0.5	52	3.4	6%
80	SDG&E-Risk-8-C8	OSHA Voluntary Protection Program	1	194.5	0.22	42	5.7	181.9	0.2	29	5.4	6%

81	SDG&E-Risk-8-C9	Safe Driving Programs	1	163.3	0.09	48	4.8	152.8	0.1	35	4.5	6%
82	SDG&E-Risk-8-C13	Enhanced Mandatory Employee Training (OSHA)	1	1981.6	0.01	4	58.3	1853.9	0.0	3	54.5	6%
83	SDG&E-Risk-8-C14	Enhanced Safety in Action Program	1	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
84	SDG&E-Risk-8-C15	Enhanced Employee Safe Driving Training	1	35.1	0.85	90	1.0	32.8	0.9	78	1.0	6%
85	SDG&E-Risk-8-M1	Purchasing and testing more protective respiratory protection for wildfire smoke particulates.	1	58.3	0.10	73	1.7	54.5	0.1	66	1.6	6%
86	SDG&E-Risk-8-M2	Purchasing break/rest trailers with filtered air systems to reduce wildfire smoke exposure	1	19.8	0.15	102	0.6	18.5	0.2	91	0.5	6%
87	SDG&E RISK 8-C16	Energized Skills Training and Testing Yard	1	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
88	SDG&E Risk 8-New01	Industrial Athletic Trainer	1	19.0	0.50	103	0.6	17.8	0.5	93	0.5	6%
89	SDG&E-RISK-9-C01	Cathodic Protection Program - O&M	4	0.5	1.88	142	0.0	0.4	2.0	140	0.0	15%
90	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	1.2	4.61	132	0.0	0.9	4.6	131	0.0	23%
91	SDG&E-RISK-9-C03	Piping in Vaults Replacement Program	40	2.6	1.63	128	0.1	1.5	1.6	128	0.0	42%
92	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	68	128.8	4.23	55	3.8	58.0	4.5	64	1.7	55%
93	SDG&E-RISK-9-C05	Regulator Station Replacement	47	0.7	1.41	140	0.0	0.4	1.4	142	0.0	45%
94	SDG&E-RISK-9-C06 T1	Leak Repair	68	34.6	10.07	91	1.0	16.2	10.4	99	0.5	53%
95	SDG&E-RISK-9-C06 T2	Leak Repair	68	60.5	6.37	71	1.8	28.3	6.6	82	0.8	53%
96	SDG&E-RISK-9-C06 T3	Leak Repair	68	1115.7	1.06	9	32.8	522.9	1.1	10	15.4	53%
97	SDG&E-RISK-9-C06 T4	Leak Repair	68	1591.4	0.70	6	46.8	745.9	0.7	8	21.9	53%
98	SDG&E-RISK-9-C08-T01	Underperforming Steel Replacement Program – Threaded Main (pre-1933 vintage)	68	0.3	7.59	145	0.0	0.1	7.8	145	0.0	53%
99	SDG&E-RISK-9-C08-T02	Underperforming Steel Replacement Program (1934-1965 vintage)	68	1.1	3.25	133	0.0	0.5	3.5	136	0.0	55%
100	SDG&E-RISK-9-C08-T03	Underperforming Steel Replacement Program – Other Steel (Post 1965 vintage)	68	4.4	3.25	122	0.1	2.2	3.2	123	0.1	51%
101	SDG&E-RISK-9-C09-T01	Early Vintage Program (Components) - Oil Drip Piping Removal	68	8.2	1.63	115	0.2	3.7	1.7	120	0.1	55%
102	SDG&E-RISK-9-C09-T02	Early Vintage Program (Components) - Dresser Mechanical Coupling Removal	68	0.5	2.17	141	0.0	0.2	2.3	144	0.0	55%
103	SDG&E-RISK-9-C09-T03	Early Vintage Program (Components) - Removal of Closed Valves between High/Medium Pressure Zones	68	1.1	1.63	135	0.0	0.5	1.6	135	0.0	51%
104	SDG&E-RISK-9-C10	Code Compliance Mitigation	40	0.9	2.88	138	0.0	0.5	2.9	134	0.0	42%
105	SDG&E-RISK-9-C11 - T1	Gas Distribution Emergency Department - Mains	68	53.7	1.88	76	1.6	24.2	2.0	87	0.7	55%
106	SDG&E-RISK-9-C11 - T2	Gas Distribution Emergency Department - Service	68	317.5	1.25	29	9.3	143.1	1.3	42	4.2	55%
107	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements - Base	10	0.0	2.05	149	0.0	0.0	2.2	150	0.0	24%
108	SDG&E-RISK-9-C14	Human Factors Mitigations - Operator Qualification Training and Certification	3	0.4	2.28	143	0.0	0.4	2.4	141	0.0	14%
109	SDG&E-RISK-9-C16-T01	DIMP – DREAMS – Vintage Integrity Plastic Plan (VIPP)	68	0.2	79.54	146	0.0	0.1	82.0	147	0.0	53%
110	SDG&E-RISK-9-C19	Field and Public Safety	1	0.0	12.04	148	0.0	0.0	12.9	148	0.0	10%
111	SDG&E-RISK-9-C20	Natural Gas Appliance Testing (NGAT) or Carbon Monoxide Testing	1	0.0	0.68	150	0.0	0.0	0.7	149	0.0	10%
112	SDG&E-RISK-9-C21	CSF Quality Assurance (QA) Program	5	0.1	0.28	147	0.0	0.1	0.3	146	0.0	17%
113	SDG&E-RISK-9-C07	Pipeline Monitoring (Leak Mitigation, Bridge & Span, Unstable Earth, and Pipeline Patrol	68	931.4	2.21	11	27.4	419.7	2.4	13	12.3	55%
114	SDG&E-RISK-9-M03	Replace Curb Valves with EFVs	68	10.1	1.90	109	0.3	4.9	1.9	117	0.1	51%
115	SDG&E-RISK-9-M04	New RAMP Mitigation: MSAs inside Bldgings and Alcoves	68	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
116	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators -(HFTD Tier 3)	25	245.9	0.53	35	7.2	145.6	0.6	41	4.3	41%
117	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators- (HFTD Tier 2)	25	222.1	0.53	38	6.5	131.5	0.6	47	3.9	41%
118	SDG&E-Risk-1-C06/M1 T2	SCADA Capacitors - (HFTD Tier 3)	0	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
119	SDG&E-Risk-1-C06/M1-T2	SCADA Capacitors - (HFTD Tier 2)	25	2385.5	1.43	3	70.2	1412.8	1.6	4	41.6	41%
120	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 3)	25	240.2	0.18	36	7.1	147.7	0.2	40	4.3	39%
121	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 2)	25	72.8	0.18	67	2.1	44.8	0.2	72	1.3	39%
122	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 3)	10	401.1	2.52	22	11.8	306.4	2.7	21	9.0	24%
123	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 2)	10	450.9	5.03	19	13.3	344.4	5.4	19	10.1	24%
124	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 3)	15	120.6	10.35	57	3.5	81.8	11.5	58	2.4	32%
125	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 2)	15	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
126	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 3)	10	345.6	0.73	24	10.2	263.5	0.8	23	7.7	24%
127	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 2)	10	172.9	1.10	45	5.1	131.9	1.2	46	3.9	24%
128	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 3)	40	157.1	261.84	50	4.6	120.7	198.6	50	3.5	23%
129	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 2)	40	76.7	153.78	66	2.3	58.1	116.7	63	1.7	24%
130	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 3)	40	37.0	5.50	86	1.1	19.5	5.9	89	0.6	47%
131	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 2)	40	0.0	0.03	151	0.0	0.0	0.0	151	0.0	0%
132	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 3)	40	61.1	1.07	70	1.8	31.0	1.2	80	0.9	49%
133	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 2)	40	38.0	13.39	85	1.1	19.3	14.9	90	0.6	49%
134	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 3)	25	223.0	1.96	37	6.6	132.1	2.2	45	3.9	41%
135	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 2)	25	47.7	0.22	79	1.4	28.2	0.2	83	0.8	41%
136	SDG&E-Risk-1-C7/M2-T1	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 3)	40	51.1	49.04	78	1.5	26.0	54.6	85	0.8	49%
137	SDG&E-Risk-1-C7/M2-T2	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 2)	40	34.8	10.77	91	1.0	17.7	12.0	93	0.5	49%
138	SDG&E-Risk-1-C9/M4-T1	PSPS Sectionalizing (HFTD Tier 3)	20	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
139	SDG&E-Risk-1-C9/M4-T2	PSPS Sectionalizing (HFTD Tier 2)	20	255.1	1.57	33	7.5	161.1	1.7	32	4.7	37%
140	SDG&E-Risk-1-C10/M5-T2	Microgrids (HFTD Tier 2)	20	25.7	4.01	97	0.8	16.2	4.5	98	0.5	37%
141	SDG&E-Risk-1-C11/M6-T1	Advanced Protection (HFTD Tier 3)	40	757.0	5.54	13	22.3	384.6	6.2	16	11.3	49%
142	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 3)	1	154.7	2.82	51	4.5	138.4	3.0	43	4.1	11%
143	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 2)	1	39.1	3.51	84	1.1	35.0	3.8	77	1.0	10%
144	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 3)	1	904.4	0.44	12	26.6	781.6	0.5	7	23.0	14%
145	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 2)	1	484.6	0.53	16	14.3	418.8	0.6	14	12.3	14%
146	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 3)	0	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
147	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 2)	1	338.3	0.18	26	9.9	303.5	0.2	20	8.9	10%
148	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 3)	1	485.7	0.09	15	14.3	435.9	0.1	12	12.8	10%
149	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 2)	1	9.4	1.23	110	0.3	8.4	1.3	108	0.2	10%
150	SDG&E-Risk-1-C27	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 3)	1	169.7	2.30	46	5.0	151.4	2.5	36	4.5	11%
151	SDG&E-Risk-1-C27-T2	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 2)	0	0.0	0.00	151	0.0	0.0	0.0	151	0.0	0%
152	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 3)	1	20.2	12.66	101	0.6	17.4	14.1	94	0.5	14%
153	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 2)	1	7.8	6.98	116	0.2	7.0	7.5	111	0.2	10%
154	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 3)	10	208.7	4.41	39	6.1	159.2	4.7	33	4.7	24%
155	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 2)	10	158.5	5.83	49	4.7	120.9	6.2	49	3.6	24%
156	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 3)	1	97.5	3.05	61	2.9	87.5	3.3	57	2.6	10%
157	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 2)	1	82.1	3.26	65	2.4	73.7	3.5	60	2.2	10%
158	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (HFTD Tier 3)	1	17.1	5.08	107	0.5	15.3	5.4	101	0.5	10%
159	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (HFTD Tier 2)	1	8.6	1.27	113	0.3	7.7	1.4	110	0.2	10%
160	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 3)	1	57.6	2.27	74	1.7	51.6	2.4	68	1.5	10%
161	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 2)	1	61.3	0.96	69	1.8	55.0	1.0	65	1.6	10%
162	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 3)	10	198.1	15.17	41	5.8	148.4	16.5	39	4.4	25%
163	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 2)	10	412.3	4.17	21	12.1	314.4	4.5	19	9.2	24%
164	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 3)	1	201.9	12.35	40	5.9	181.2	13.2	30	5.3	10%
165	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 2)	1	182.2	14.89	44	5.4	163.5	15.9	31	4.8	10%
166	SDG&E-Risk-2-C08-T1	Avian Protection (HFTD Tier 3)	55	344.4	1.37	25	10.1	157.4	1.5	34	4.6	54%

Table 6. Post Test Year (PTY) RSE and B-C Ratio results for SDG&E under SDG&E's approach and TURN's approach (Sorted by Risk)

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Post Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra PTY RSE w/ CFF	Cost (Nominal $ M)	Overall RSE rank	B/C Ratio	Revised PTY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in RSE
1	SDG&E-Risk-2-C1	Overhead Public Safety (OPS) Program	55	6.1	24.08	121	0.2	3.6	21.0	122	0.1	42%

2	SDG&E-Risk-2-C3	4kV Modernization Program – Distribution	55	6.8	19.30	118	0.2	4.0	16.8	120	0.1	42%
3	SDG&E-Risk-2-C4	Distribution Overhead Switch Replacement Program	55	52.1	4.04	71	1.5	30.4	3.5	78	0.9	42%
4	SDG&E-Risk-2-C6	Tree Trimming (non-HFTD)	1	19.5	27.31	99	0.6	21.5	23.7	85	0.6	-11%
5	SDG&E-Risk-2-C8	Aviation Protection Program	55	26.1	5.08	90	0.8	15.2	4.4	99	0.4	42%
6	SDG&E-Risk-2-C10-T1-T2	Underground Cable Replacement Program (Proactive)	45	426.4	14.87	15	12.5	266.0	12.9	20	7.8	38%
7	SDG&E-Risk-2-C10-T3	Underground Cable Replacement Program (Proactive) – North Harbor Project	45	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
8	SDG&E-Risk-2-C11	Tee Modernization Program	57	341.2	13.26	18	10.0	197.2	11.5	24	5.8	42%
9	SDG&E-Risk-2-C13	Replacement of Live Front Equipment - Proactive	57	4.6	2.48	124	0.1	2.7	2.2	124	0.1	42%
10	SDG&E-Risk-2-C14	DOE Switch Replacement – Underground	45	33.8	26.81	82	1.0	21.1	23.3	87	0.6	38%
11	SDG&E-Risk-2-C15	GO165 Corrective Maintenance Program – Underground	45	0.7	45.25	137	0.0	0.4	39.4	142	0.0	38%
12	SDG&E-Risk-2-C16	GO 165 Manhole, Vault Restoration Program	45	0.0	17.09	156	0.0	0.0	14.9	158	0.0	0%
13	SDG&E-Risk-2-C18 - T1	Distribution Circuit Reliability - Underground	45	98.5	10.24	52	2.9	61.4	8.9	61	1.8	38%
14	SDG&E-Risk-2-C18 -T2	Distribution Circuit Reliability - Overhead	45	113.4	5.50	49	3.3	70.8	4.8	59	2.1	38%
15	SDG&E-Risk-2-C20 -T2	Substation Reliability for Distribution Components – Bernardo 12kV Breakers Replacements	51	3.2	0.71	126	0.1	1.9	0.6	126	0.1	40%
16	SDG&E-Risk-2-C20-T5	Substation Reliability for Distribution Components – Miramar 12kV Replacements	51	2.2	1.07	128	0.1	1.3	0.9	128	0.0	40%
17	SDG&E-Risk-2-C20-T8	Substation Reliability for Distribution Components – Coronado 69/12kV Transformer Replacements	51	1.1	1.70	131	0.0	0.7	1.5	134	0.0	40%
18	SDG&E-Risk-2-C21	Distribution Substation Obsolete Equipment	51	1.0	9.66	133	0.0	0.6	8.4	136	0.0	40%
19	SDG&E-Risk-2-C24	Urban Substation Rebuild	51	0.1	17.73	149	0.0	0.1	15.4	151	0.0	40%
20	SDG&E-Risk-2-C28	Field SCADA RTU Replacement	45	156.5	4.00	41	4.6	97.6	3.5	48	2.9	38%
21	SDG&E-Risk-2-C29-T1	SCADA Capacitors - Overhead	12	21.6	2.08	94	0.6	19.6	1.8	92	0.6	9%
22	SDG&E-Risk-2-C29-T2	SCADA Capacitors - Undergroundf	12	19.7	0.87	98	0.6	17.9	0.8	95	0.5	9%
23	SDG&E-Risk-2-New 01	Mission 12KV Replacements	51	0.9	3.01	134	0.0	0.5	2.6	140	0.0	40%
24	SDG&E-Risk-2-New 02	Stuart 12kV Transformer Replacement	51	0.5	1.17	142	0.0	0.3	1.0	146	0.0	40%
25	SDG&E-Risk-2-New 03	La Jolla 69/12kV Transformer Replacement	51	0.3	2.41	146	0.0	0.2	2.1	148	0.0	40%
26	SDG&E-Risk-2-New 04	Poway 69kV Substation Rebuild	51	0.0	164.64	155	0.0	0.0	144.2	157	0.0	40%
27	SDG&E-Risk-2-New 05	San Marcos Substation 69kV Rebuild & 12kV Switchgear	51	0.0	130.66	154	0.0	0.0	116.0	156	0.0	41%
28	SDG&E-Risk-2-New 06	Substation Modification To Support FLISR	51	0.0	46.87	153	0.0	0.0	41.3	155	0.0	41%
29	SDG&E-Risk-2-New 07	Torrey Pines 12kV Breaker Replacements	51	0.0	0.00	156	0.0	0.7	1.6	133	0.0	0%
30	SDG&E-Risk-2-New 08	El Cajon 12kV Breaker Replacements	51	0.0	0.00	156	0.0	0.7	1.6	132	0.0	0%
31	SDG&E-Risk-2-New 09	Strategic Pole Replacement Program (Non-HFTD)	51	17.6	5.43	102	0.5	10.5	4.7	108	0.3	40%
32	SDG&E-RISK-3-M04	Adobe Falls Relocation Project	64	46.2	2.70	73	1.4	25.8	2.4	81	0.8	44%
33	SDG&E-RISK-3-C01-T01	Cathodic Protection - Capital - HCA	64	169.6	2.18	39	5.0	94.7	1.9	51	2.8	44%
34	SDG&E-RISK-3-C01-T02	Cathodic Protection - Capital - Non-HCA	64	55.4	0.48	65	1.6	30.9	0.4	76	0.9	44%
35	SDG&E-RISK-3-C02-T01	Cathodic Protection - Maintenance - HCA	1	2718.9	0.09	2	80.0	3005.4	0.1	2	88.4	-11%
36	SDG&E-RISK-3-C02-T02	Cathodic Protection - Maintenance - Non-HCA	1	1158.2	0.02	6	34.1	1280.3	0.0	5	37.7	-11%
37	SDG&E-RISK-3-C09	Compressor Station - Maintenance	1	27.4	4.33	88	0.8	30.3	3.8	79	0.9	-11%
38	SDG&E-RISK-3-C08	Compressor Stations - Capital	50	13.3	24.49	107	0.4	8.0	21.3	114	0.2	40%
39	SDG&E-RISK-3-M02-T01	Gas Transmission Safety Rule - MAOP Reconfirmation - HCA	8.71	12.7	80.99	110	0.4	12.1	71.3	106	0.4	5%
40	SDG&E-RISK-3-M02-T02	Gas Transmission Safety Rule - MAOP Reconfirmation - Non-HCA	8.71	18.6	5.23	100	0.5	17.6	4.6	96	0.5	5%
41	SDG&E-RISK-3-C15-T01	Integrity Assessments & Remediation - HCA	7	26.8	52.29	89	0.8	26.4	45.8	80	0.8	2%
42	SDG&E-RISK-3-C15-T02	Integrity Assessments & Remediation - Non-HCA	10	54.8	5.04	67	1.6	53.1	4.3	66	1.6	3%
43	SDG&E-RISK-3-C03-T01	Leak Repair - HCA	64	11.4	2.42	113	0.3	6.4	2.1	118	0.2	44%
44	SDG&E-RISK-3-C03-T02	Leak Repair - Non-HCA	64	20.1	0.53	97	0.6	11.2	0.5	107	0.3	44%
45	SDG&E-RISK-3-C10-T01	Measurement & Regulation Station – Capital - HCA	46	6.3	2.98	120	0.2	3.9	2.6	121	0.1	38%
46	SDG&E-RISK-3-C10-T02	Measurement & Regulation Station – Capital - Non-HCA	46	0.9	0.66	135	0.0	0.5	0.6	138	0.0	38%
47	SDG&E-RISK-3-C11-T01	Measurement & Regulation Station – Maintenance - HCA	46	524.4	0.40	10	15.4	325.2	0.3	17	9.6	38%
48	SDG&E-RISK-3-C11-T02	Measurement & Regulation Station – Maintenance Non-HCA	46	224.2	0.09	29	6.6	139.0	0.1	40	4.1	38%
49	SDG&E-RISK-3-C12	Odorization	1	8.0	0.01	116	0.2	8.8	0.0	111	0.3	-11%
50	SDG&E-RISK-3-C06-T01	Pipeline Maintenance - HCA	1	101.8	1.76	51	3.0	112.5	1.5	44	3.3	-10%
51	SDG&E-RISK-3-C06-T02	Pipeline Maintenance - Non-HCA	1	43.9	0.39	75	1.3	48.5	0.3	70	1.4	-10%
52	SDG&E-RISK-3-C04-T01	Pipeline Relocation/Replacement - HCA	64	15.5	10.59	104	0.5	8.7	9.2	112	0.3	44%
53	SDG&E-RISK-3-C04-T02	Pipeline Relocation/Replacement - Non-HCA	64	29.5	2.33	87	0.9	16.5	2.0	98	0.5	44%
54	SDG&E-RISK-3-C13	Security and Auxiliary Equipment	10	0.7	1.79	139	0.0	0.6	1.6	135	0.0	6%
55	SDG&E-RISK-3-C05-T01	Shallow/Exposed Pipe Remediations - HCA	64	2119.5	1.21	3	62.3	1183.9	1.0	6	34.8	44%
56	SDG&E-RISK-3-C05-T02	Shallow/Exposed Pipe Remediations - Non-HCA	64	181.9	0.27	37	5.4	101.6	0.2	46	3.0	44%
57	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	62.1	0.79	64	1.8	53.8	0.7	65	1.6	13%
58	SDG&E-RISK-9-C05	Reg Station Replacement Program	47	254.1	1.29	24	7.5	156.2	1.1	34	4.6	39%
59	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements	10	0.6	0.42	140	0.0	0.5	0.4	139	0.0	6%
60	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	1	511.5	0.11	11	15.0	565.4	0.1	8	16.6	-11%
61	SDG&E-RISK-9-C01	Cathodic Protection - O&M	4.1	23.6	0.35	91	0.7	24.6	0.3	83	0.7	-4%
62	Moreno Principal	Moreno Principal	35	20.6	69.20	96	0.6	13.2	63.9	102	0.4	36%
63	SDG&E-RISK-3-New-FIMP-Dist	NEW - Facility Integrity Management (FIMP)- Distribution	2.5	11.4	1.10	112	0.3	12.2	1.0	105	0.4	-7%
64	SDG&E-RISK-3-New-FIMP-Trans	NEW - Facility Integrity Management (FIMP)- Transmission	2.5	437.4	0.29	13	12.9	468.9	0.3	10	13.8	-7%
65	SDG&E-Risk-4-C1	Contractor Oversight Program	1	247.2	1.22	25	7.3	271.7	1.1	19	8.0	-10%
66	SDG&E-Risk-4-C2	Field Safety Oversight	1	86.7	4.36	55	2.6	95.3	3.8	49	2.8	-10%
67	SDG&E-Risk-4-M2	Enhanced Verification of Class 1 Contractor Employee Specific Training	1	237.6	0.16	26	7.0	261.1	0.1	21	7.7	-10%
68	SDG&E-RISK-7-C16-T1/T2/T3/T4	Public Awareness	1	79.8	0.05	58	2.3	88.2	0.0	54	2.6	-11%
69	SDG&E-RISK-7-C04	Locate & Mark Activities (HP)	1	327.2	0.39	20	9.6	361.7	0.3	14	10.6	-11%
70	SDG&E-RISK-7-C12	Damage Prevention Analyst Program	1	38.9	0.02	79	1.1	42.9	0.0	72	1.3	-11%
71	SDG&E-RISK-7-M2	Automate Third Party Excavation Incident Reporting	5	12.7	0.01	109	0.4	13.0	0.0	103	0.4	-2%
72	SDG&E-RISK-7-M1	Automate Third Party Excavation Incident Reporting	5	9.4	0.05	114	0.3	9.6	0.0	109	0.3	-2%
73	SDG&E-RISK-7-C11	Damage Prevention Analyst Program	1	81.5	0.13	57	2.4	90.1	0.1	53	2.6	-11%
74	SDG&E-RISK-7-C03	Locate and Mark Activities*	1	4.8	13.91	123	0.1	5.3	12.1	119	0.2	-11%
75	SDG&E-RISK-7-C09	Locate and Mark Quality Assurance	1	1.1	0.58	132	0.0	1.2	0.5	129	0.0	-11%
76	SDG&E-RISK-7-C13	Locating Equipment	5	96.3	1.27	53	2.8	98.6	1.1	47	2.9	-2%
77	SDG&E-RISK-7-C15-T1/T2/T3/T4	Public Awareness	1	41.1	0.23	76	1.2	45.4	0.2	71	1.3	-11%
78	SDG&E-Risk-8-C3	Strong Safety Culture	1	229.5	267.57	28	6.8	253.1	233.1	23	7.4	-10%
79	SDG&E-Risk-8-C4	Employee Behavioral Accident Prevention Process Program	1	74.6	548.70	59	2.2	82.3	478.1	56	2.4	-10%
80	SDG&E-Risk-8-C8	OSHA Voluntary Protection Program	1	118.6	241.61	47	3.5	130.8	210.5	42	3.8	-10%
81	SDG&E-Risk-8-C9	Safe Driving Programs	1	62.6	102.74	63	1.8	69.0	89.5	60	2.0	-10%
82	SDG&E-Risk-8-C13	Enhanced Mandatory Employee Training (OSHA): Certified Occupational Safety Specialist, Certified Utility Safety Professional; Certified Safety Professional	1	1208.8	6.77	5	35.6	1333.2	5.9	4	39.2	-10%
83	SDG&E-Risk-8-C14	Enhanced Safety in Action Program	1	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
84	SDG&E-Risk-8-C15	Enhanced Employee Safe Driving Training	1	13.4	957.40	106	0.4	14.8	834.2	100	0.4	-10%
85	SDG&E-Risk-8-M1	Purchasing and testing more protective respiratory protection for wildfire smoke particulates.	1	35.6	115.16	81	1.0	39.2	100.3	73	1.2	-10%
86	SDG&E-Risk-8-M2	Purchasing break/rest trailers with filtered air systems to reduce wildfire smoke exposure	1	16.6	169.35	103	0.5	18.3	147.6	93	0.5	-10%
87	SDG&E RISK 8-C16	Energized Skills Training and Testing Yard	1	68.7	397.28	61	2.0	75.8	346.2	58	2.2	-10%
88	SDG&E Risk 8-New01	Industrial Athletic Trainer	1	52.9	168.22	69	1.6	58.4	146.6	63	1.7	-10%
89	SDG&E-RISK-9-C01	Cathodic Protection Program - O&M	4	0.3	2.55	145	0.0	0.4	2.2	144	0.0	-4%
90	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	15	1.3	13.98	130	0.0	1.1	12.2	130	0.0	13%
91	SDG&E-RISK-9-C03	Piping in Vaults Replacement Program	40	3.7	5.05	125	0.1	2.4	4.4	125	0.1	35%
92	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	68	92.0	5.75	54	2.7	50.6	5.0	68	1.5	45%
93	SDG&E-RISK-9-C05	Regulator Station Replacement	47	0.6	3.80	141	0.0	0.4	3.3	145	0.0	39%
94	SDG&E-RISK-9-C06 T1	Leak Repair	68	12.4	26.92	111	0.4	6.8	23.4	117	0.2	45%
95	SDG&E-RISK-9-C06 T2	Leak Repair	68	22.3	16.99	92	0.7	12.2	14.8	104	0.4	45%
96	SDG&E-RISK-9-C06 T3	Leak Repair	68	326.0	3.63	21	9.6	179.1	3.2	26	5.3	45%
97	SDG&E-RISK-9-C06 T4	Leak Repair	68	463.2	2.39	12	13.6	254.5	2.1	22	7.5	45%
98	SDG&E-RISK-9-C08-T01	Underperforming Steel Replacement Program – Threaded Main (pre-1933 vintage)	68	0.4	24.20	144	0.0	0.2	21.1	147	0.0	45%

99	SDG&E-RISK-9-C08-T02	Underperforming Steel Replacement Program (1934-1965 vintage)	68	1.3	18.53	129	0.0	0.7	16.1	131	0.0	45%
100	SDG&E-RISK-9-C08-T03	Underperforming Steel Replacement Program – Other Steel (Post 1965 vintage)	68	5.4	9.54	122	0.2	3.0	8.3	123	0.1	45%
101	SDG&E-RISK-9-C09-T01	Early Vintage Program (Components) - Oil Drip Piping Removal	68	45.9	5.55	74	1.4	25.2	4.8	82	0.7	45%
102	SDG&E-RISK-9-C09-T02	Early Vintage Program (Components) - Dresser Mechanical Coupling Removal	68	0.7	7.63	138	0.0	0.4	6.6	143	0.0	45%
103	SDG&E-RISK-9-C09-T03	Early Vintage Program (Components) - Removal of Closed Valves between High/Medium Pressure Zones	68	2.5	3.91	127	0.1	1.4	3.4	127	0.0	45%
104	SDG&E-RISK-9-C10	Code Compliance Mitigation	40	0.9	9.33	136	0.0	0.6	8.1	137	0.0	35%
105	SDG&E-RISK-9-C11 - T1	Gas Distribution Emergency Department - Mains	68	38.4	2.55	80	1.1	21.1	2.2	86	0.6	45%
106	SDG&E-RISK-9-C11 - T2	Gas Distribution Emergency Department - Service	68	233.4	1.70	27	6.9	128.4	1.5	43	3.8	45%
107	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements - Base	10	0.0	6.30	150	0.0	0.0	5.5	152	0.0	6%
108	SDG&E-RISK-9-C14	Human Factors Mitigations - Operator Qualification Training and Certification	3	0.5	1.91	143	0.0	0.5	1.7	141	0.0	-6%
109	SDG&E-RISK-9-C16-T01	DIMP – DREAMS – Vintage Integrity Plastic Plan (VIPP)	68	0.2	290.23	147	0.0	0.1	252.0	150	0.0	45%
110	SDG&E-RISK-9-C19	Field and Public Safety	1	0.0	16.35	151	0.0	0.0	14.2	153	0.0	-11%
111	SDG&E-RISK-9-C20	Natural Gas Appliance Testing (NGAT) or Carbon Monoxide Testing	1	0.0	2.32	152	0.0	0.0	2.0	154	0.0	-10%
112	SDG&E-RISK-9-C21	CSF Quality Assurance (QA) Program	5	0.1	0.39	148	0.0	0.1	0.3	149	0.0	-2%
113	SDG&E-RISK-9-C07	Pipeline Monitoring (Leak Mitigation, Bridge & Span, Unstable Earth, and Pipeline Patrol	68	681.6	3.01	8	20.0	374.8	2.6	13	11.0	45%
114	SDG&E-RISK-9-M03	Replace Curb Valves with EFVs	68	13.2	2.98	108	0.4	7.2	2.6	116	0.2	45%
115	SDG&E-RISK-9-M04	New RAMP Mitigation: MSAs inside Bldgings and Alcoves	68	40.7	1.85	78	1.2	22.3	1.6	84	0.7	45%
116	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators -(HFTD Tier 3)	25	210.0	2.06	33	6.2	158.7	1.8	33	4.7	24%
117	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators- (HFTD Tier 2)	25	189.6	2.06	35	5.6	143.3	1.8	38	4.2	24%
118	SDG&E-Risk-1-C06/M1 T2	SCADA Capacitors - (HFTD Tier 3)	0	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
119	SDG&E-Risk-1-C06/M1-T2	SCADA Capacitors - (HFTD Tier 2)	25	2037.0	5.51	4	59.9	1539.8	4.8	3	45.3	24%
120	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 3)	25	212.2	0.68	32	6.2	160.4	0.6	32	4.7	24%
121	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 2)	25	64.3	0.68	62	1.9	48.6	0.6	69	1.4	24%
122	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 3)	10	335.5	12.94	19	9.9	314.5	11.3	18	9.3	6%
123	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 2)	10	374.4	25.89	17	11.0	351.0	22.6	15	10.3	6%
124	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 3)	15	106.5	38.65	50	3.1	92.2	33.7	52	2.7	13%
125	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 2)	15	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
126	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 3)	10	4804.7	0.17	1	141.3	4504.3	0.2	1	132.5	6%
127	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 2)	10	152.8	4.10	42	4.5	143.2	3.6	39	4.2	6%
128	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 3)	40	223.9	779.74	30	6.6	143.6	686.7	37	4.2	36%
129	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 2)	40	138.8	356.76	45	4.1	87.2	320.9	55	2.6	37%
130	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 3)	40	31.6	21.25	85	0.9	20.5	18.5	89	0.6	35%
131	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 2)	40	0.0	0.10	156	0.0	0.0	0.1	158	0.0	0%
132	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 3)	40	52.2	4.13	70	1.5	33.8	3.6	75	1.0	35%
133	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 2)	40	32.5	51.75	84	1.0	21.1	45.1	88	0.6	35%
134	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 3)	25	190.4	7.59	34	5.6	144.0	6.6	36	4.2	24%
135	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 2)	25	40.7	0.86	77	1.2	30.8	0.7	77	0.9	24%
136	SDG&E-Risk-1-C7/M2-T1	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 3)	40	31.3	510.55	86	0.9	20.3	444.8	90	0.6	35%
137	SDG&E-Risk-1-C7/M2-T2	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 2)	40	20.8	112.07	95	0.6	13.5	97.6	101	0.4	35%
138	SDG&E-Risk-1-C9/M4-T1	PSPS Sectionalizing (HFTD Tier 3)	20	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
139	SDG&E-Risk-1-C9/M4-T2	PSPS Sectionalizing (HFTD Tier 2)	20	217.8	6.05	31	6.4	175.6	5.3	28	5.2	19%
140	SDG&E-Risk-1-C10/M5-T2	Microgrids (HFTD Tier 2)	20	22.2	15.27	93	0.7	17.9	13.3	94	0.5	19%
141	SDG&E-Risk-1-C11/M6-T1	Advanced Protection (HFTD Tier 3)	40	646.4	21.40	9	19.0	419.2	18.6	12	12.3	35%
142	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 3)	1	132.4	10.86	46	3.9	146.0	9.5	35	4.3	-10%
143	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 2)	1	33.4	13.55	83	1.0	36.9	11.8	74	1.1	-10%
144	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 3)	1	779.7	1.70	7	22.9	860.1	1.5	7	25.3	-10%
145	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 2)	1	417.8	2.01	16	12.3	460.9	1.8	11	13.6	-10%
146	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 3)	0	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
147	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 2)	1	298.8	0.65	23	8.8	329.7	0.6	16	9.7	-10%
148	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 3)	1	428.6	0.32	14	12.6	472.8	0.3	9	13.9	-10%
149	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 2)	1	8.0	4.73	115	0.2	8.8	4.1	110	0.3	-10%
150	SDG&E-Risk-1-C27	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 3)	1	145.6	8.84	43	4.3	160.6	7.7	31	4.7	-10%
151	SDG&E-Risk-1-C27-T2	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 2)	0	0.0	0.00	156	0.0	0.0	0.0	158	0.0	0%
152	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 3)	1	17.8	47.26	101	0.5	19.7	41.2	91	0.6	-10%
153	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 2)	1	6.7	26.97	119	0.2	7.4	23.5	115	0.2	-10%
154	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 3)	10	184.4	16.47	36	5.4	172.9	14.3	30	5.1	6%
155	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 2)	10	140.0	21.75	44	4.1	131.3	18.9	41	3.9	6%
156	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 3)	1	86.2	11.39	56	2.5	95.1	9.9	50	2.8	-10%
157	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 2)	1	72.5	12.18	60	2.1	80.0	10.6	57	2.4	-10%
158	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (HFTD Tier 3)	1	15.5	18.98	105	0.5	17.1	16.5	97	0.5	-10%
159	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (HFTD Tier 2)	1	7.7	4.74	117	0.2	8.5	4.1	113	0.2	-10%
160	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 3)	1	50.8	8.47	72	1.5	56.1	7.4	64	1.6	-10%
161	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 2)	1	54.2	3.60	68	1.6	59.7	3.1	62	1.8	-10%
162	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 3)	10	54.9	57.69	66	1.6	51.5	50.3	67	1.5	6%
163	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 2)	10	115.4	15.57	48	3.4	108.2	13.6	45	3.2	6%
164	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 3)	1	178.4	46.10	38	5.2	196.8	40.2	25	5.8	-10%
165	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 2)	1	161.0	55.59	40	4.7	177.6	48.4	27	5.2	-10%
166	SDG&E-Risk-2-C08-T1	Avian Protection (HFTD Tier 3)	55	299.9	4.82	22	8.8	175.0	4.2	29	5.1	42%

Table 7. Test Year (TY) RSE and B-C Ratio results for SCG under SCG's approach and TURN's approach (Sorted by Risk)

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra TY RSE w/ CFF	Cost (2021$ M)	Overall RSE rank	B/C Ratio	Revised TY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in
1	SCG-RISK-1-C01-T01	Cathodic Protection - Capital	64	588.6	2.6	2	17.3	292.1	2.6	8	8.6	50%
2	SCG-RISK-1-C01-T02	Cathodic Protection - Capital	64	325.3	5.2	10	9.6	161.4	5.2	14	4.7	50%
3	SCG-RISK-1-C02-T01	Cathodic Protection - Maintenance	1	476.6	0.5	6	14.0	429.6	0.5	4	12.6	10%
4	SCG-RISK-1-C02-T02	Cathodic Protection - Maintenance	1	250.3	1.0	13	7.4	225.6	1.1	10	6.6	10%
5	SCG-RISK-1-C03-T01	Leak Repair	64	15.3	3.9	55	0.4	7.6	3.8	65	0.2	50%
6	SCG-RISK-1-C03-T02	Leak Repair	64	8.9	7.9	65	0.3	4.4	7.8	69	0.1	50%
7	SCG-RISK-1-C04-T01	Leak Survey & Patrol	1	341.4	0.8	9	10.0	307.7	0.9	7	9.1	10%
8	SCG-RISK-1-C04-T02	Leak Survey & Patrol	1	96.5	1.7	26	2.8	87.0	1.8	23	2.6	10%
9	SCG-RISK-1-C05-T01	Pipeline Relocation/Replacement - Capital	64	1.9	7.7	91	0.1	0.9	7.7	92	0.0	50%
10	SCG-RISK-1-C05-T02	Pipeline Relocation/Replacement - Capital	64	1.0	15.7	94	0.0	0.5	15.6	97	0.0	50%
11	SCG-RISK-1-C06-T01	Shallow/Exposed Pipe Remediations	64	347.8	1.3	8	10.2	172.6	1.3	13	5.1	50%
12	SCG-RISK-1-C06-T02	Shallow/Exposed Pipe Remediations	64	212.6	2.6	15	6.3	105.5	2.6	18	3.1	50%
13	SCG-RISK-1-C07-T01	Pipeline Maintenance	1	572.2	0.3	4	16.8	515.8	0.3	2	15.2	10%
14	SCG-RISK-1-C07-T02	Pipeline Maintenance	1	299.4	0.6	11	8.8	269.9	0.7	9	7.9	10%
15	SCG-RISK-1-C08-T01	Right of Way	1	3.7	0.8	76	0.1	3.3	0.8	75	0.1	10%
16	SCG-RISK-1-C08-T02	Right of Way	1	1.9	1.6	89	0.1	1.7	1.7	84	0.1	10%
17	SCG-RISK-1-C09-T01	Class Location (Hydrotest) - Maintenance	7	34.5	0.3	39	1.0	27.9	0.3	39	0.8	19%
18	SCG-RISK-1-C09-T02	Class Location (Hydrotest) - Maintenance	7	17.8	0.5	53	0.5	14.4	0.6	53	0.4	19%
19	SCG-RISK-1-C10	Compressor Stations - Capital	50	2.1	11.2	85	0.1	1.1	11.1	90	0.0	46%
20	SCG-RISK-1-C11	Compressor Station - Maintenance	1	3.0	13.4	78	0.1	2.7	14.3	76	0.1	10%
21	SCG-RISK-1-C12-T01	Measurement & Regulation - Capital	46	2.0	12.9	88	0.1	1.1	12.8	91	0.0	45%

22	SCG-RISK-1-C12-T02	Measurement & Regulation - Capital	46	1.1	26.2	93	0.0	0.6	25.9	96	0.0	45%
23	SCG-RISK-1-C13-T01	Measurement & Regulation Station - Maintenance	46	266.2	0.8	12	7.8	135.8	0.8	15	4.0	49%
24	SCG-RISK-1-C13-T02	Measurement & Regulation Station - Maintenance	46	139.9	1.6	19	4.1	71.4	1.7	26	2.1	49%
25	SCG-RISK-1-C14	Odorization	1	0.1	0.8	113	0.0	0.1	0.8	111	0.0	3%
26	SCG-RISK-1-C15	Security and Auxiliary Equipment	10	5.9	0.8	67	0.2	4.8	0.8	66	0.1	17%
27	SCG-RISK-1-C20	Facility Integrity Management Program (FIMP) - Transmission	2.5	2.8	3.9	80	0.1	2.5	4.1	77	0.1	9%
28	SCG-RISK-1-C21-T01	Integrity Assessments & Remediation	7	4.1	183.7	72	0.1	3.5	189.0	74	0.1	16%
29	SCG-RISK-1-C21-T02	Integrity Assessments & Remediation	10	2.3	152.4	83	0.1	1.8	156.7	83	0.1	20%
30	SCG-RISK-1-C22-T02.4	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 1B, GRC base)	64	4.0	22.3	73	0.1	2.0	22.0	80	0.1	50%
31	SCG-RISK-1-C22-T03.2	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 2A, GRC base)	64	55.1	25.7	33	1.6	27.4	25.4	40	0.8	50%
32	SCG-RISK-1-C22-T03.4	Pipeline Safety Enhancement Plan - Hydrotesting (Phase 2A, GRC base)	7	1.9	79.0	90	0.1	1.5	84.3	85	0.0	19%
33	SCG-RISK-1-C22-T04.3	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	84.7	4.2	28	2.5	46.5	4.2	32	1.4	45%
34	SCG-RISK-1-C22-T04.4	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	15.5	5.5	54	0.5	8.5	5.4	64	0.3	45%
35	SCG-RISK-1-C23-T1	Blythe Compressor Station Modernization	35	0.0	0.0	117	0.0	0.0	0.0	117	0.0	0%
36	SCG-RISK-1-M01-T01	Gas Transmission Safety Rule - MAOP Reconfirmation	8.71	2.9	83.0	79	0.1	2.5	82.1	78	0.1	15%
37	SCG-RISK-1-M01-T02	Gas Transmission Safety Rule - MAOP Reconfirmation	8.71	10.2	25.5	63	0.3	8.7	25.2	63	0.3	15%
38	SCG-RISK-1-New-FIMP-Dist	NEW - Facility Integrity Management Program (FIMP) - Distribution	2.5	13.9	1.7	58	0.4	12.6	1.8	55	0.4	9%
39	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	24.1	1.3	48	0.7	21.7	1.4	45	0.6	10%
40	SCG-RISK-3-C04	Meter & Regulator (M&R) Station and Electronic Pressure Monitors (EPM) Inspection and Maintenance	1	564.3	0.8	5	16.6	508.7	0.9	3	15.0	10%
41	SCG-RISK-3-C05	Regulator Station Installation & Replacement	47	101.9	0.3	25	3.0	55.6	0.3	30	1.6	45%
42	SCG-RISK-3-C07	EPM Installations & Replacements	10	209.6	0.3	16	6.2	173.5	0.3	12	5.1	17%
43	SCG-RISK-3-C08/C17	Leak Survey	3	0.3	3.5	105	0.0	0.3	3.7	103	0.0	14%
44	SCG-RISK-3-C09	Pipeline Monitoring (Bridge & Span)	1	693.3	0.1	1	20.4	624.9	0.1	1	18.4	10%
45	SCG-RISK-3-C10	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	1	234.4	0.1	14	6.9	211.3	0.1	11	6.2	10%
46	SCG-RISK-3-C12	Valve Inspection & Maintenance	1	67.5	0.7	31	2.0	60.8	0.7	29	1.8	10%
47	SCG-RISK-3-C13	Valve Installs and Replacements	47	2.3	1.0	81	0.1	1.3	1.0	87	0.0	45%
48	SCG-RISK-3-C14	Cathodic Protection- Install / Replace Impressed Current Systems	20	2.0	0.6	87	0.1	1.4	0.6	86	0.0	29%
49	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	10	0.3	0.2	106	0.0	0.2	0.2	105	0.0	17%
50	SCG-RISK-3-C19-T1	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.4	2.5	102	0.0	0.2	2.5	106	0.0	51%
51	Ventura ARE	Ventura ARE	35	0.0	0.0	117	0.0	0.0	0.0	117	0.0	0%
52	Ventura Principal	Ventura Principal	35	0.3	33.8	104	0.0	0.2	33.4	107	0.0	40%
53	SCG-RISK-2-M2	Automate Third Party Excavation Incident Reporting	5	113.7	0.0	21	3.3	93.3	0.0	20	2.7	18%
54	SCG-RISK-2-C12	Damage Prevention Analyst Program	1	33.2	0.3	40	1.0	30.4	0.4	37	0.9	8%
55	SCG-RISK-2-C16-T01/T02/T03/T04	Public Awareness	1	102.9	0.1	24	3.0	90.4	0.2	21	2.7	12%
56	SCG-RISK-2-C14	Locating Equipment (HP)	1	65.4	0.2	32	1.9	62.8	0.2	28	1.8	4%
57	SCG-RISK-2-C04	Locate & Mark Activities (HP)	1	87.3	5.4	27	2.6	77.5	5.9	24	2.3	11%
58	SCG-RISK-2-C06	Locate and Mark Annual Refresher Training and Competency Program (HP)	1	143.6	0.0	18	4.2	126.7	0.0	17	3.7	12%
59	SCG-RISK-2-C26	Pipeline Patrol and Pipeline Markers	1	41.1	0.5	37	1.2	36.1	0.6	35	1.1	12%
60	SCG-RISK-2-C32	Ticket Risk Assessment, and evaluating City permit data	1	5.5	0.1	70	0.2	4.8	0.1	67	0.1	12%
61	SCG-RISK-2-C15-T01/T02/T03/T04	Public Awareness	1	22.4	0.6	49	0.7	20.1	0.7	46	0.6	10%
62	SCG-RISK-2-C03	Locate and Mark Activities (MP)	1	12.5	23.3	60	0.4	12.4	22.5	56	0.4	0%
63	SCG-RISK-2-C05	Locate and Mark Annual Refresher Training and Competency Program (MP)	1	19.5	0.1	51	0.6	15.8	0.1	51	0.5	19%
64	SCG-RISK-2-C11	Damage Prevention Analyst Program	1	47.5	1.4	34	1.4	28.5	2.2	38	0.8	40%
65	SCG-RISK-2-C13	Locating Equipment (MP)	5	0.2	0.7	108	0.0	0.2	0.6	104	0.0	-1%
66	SCG-RISK-2-M1	Automate Third Party Excavation Incident Reporting	5	78.0	0.1	29	2.3	72.5	0.1	25	2.1	7%
67	SCG-RISK-3-C10	Pipeline Monitoring (Bridge & Span)	1	12.8	0.1	59	0.4	11.5	0.1	58	0.3	10%
68	SCG-RISK-3-C11	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	0.25	390.8	0.0	7	11.5	356.4	0.0	6	10.5	9%
69	SCG-RISK-3-C14	Cathodic Protection – Install/Replace Impressed Current Systems	20	1.8	6.7	92	0.1	1.3	6.6	88	0.0	29%
70	SCG-RISK-3-C03	Cathodic Protection- 100mV Requalification	10	25.8	1.4	45	0.8	19.8	1.5	47	0.6	23%
71	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	2.0	15.5	86	0.1	1.8	16.5	82	0.1	10%
72	SCG-RISK-3-C02	Cathodic Protection- CP10 Activities	10	5.5	2.4	69	0.2	4.2	2.6	71	0.1	23%
73	SCG-RISK-3-C20	DIMP: Distribution Riser Inspection Project (DRIP)	67	103.4	26.8	23	3.0	46.9	28.7	31	1.4	55%
74	SCG-RISK-3-C21-T2	DIMP: DREAMS- Bare Steel Replacement Program (BSRP)	68	0.1	32.2	111	0.0	0.1	31.8	113	0.0	51%
75	SCG-RISK-3-C21-T1	DIMP: DREAMS- Vintage Integrity Plastic Plan (VIPP)	68	0.3	219.3	107	0.0	0.1	217.2	108	0.0	51%
76	SCG-RISK-3-C22	DIMP: Gas Infrastructure Protection Project (GIPP)- Medium Pressure and High pressure	40	32.5	18.4	41	1.0	18.7	18.3	49	0.6	42%
77	SCG-RISK-3-C23	DIMP: Sewer Lateral Inspection Project (SLIP)	67	0.9	22.6	95	0.0	0.4	24.2	100	0.0	55%
78	SCG-RISK-3-C07	EPM Replacements & Installs	10	14.1	0.5	57	0.4	11.6	0.5	57	0.3	17%
79	SCG-RISK-3-C25	Field Employee Skills Training	5	0.1	8.1	114	0.0	0.0	8.7	115	0.0	17%
80	SCG-RISK-3-C08/C17	Leak Survey and Main & Service Leak Repair	3	5.6	23.1	68	0.2	4.8	24.7	68	0.1	14%
81	SCG-RISK-3-C19 T2	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.2	16.6	109	0.0	0.1	16.4	109	0.0	51%
82	SCG-RISK-3-C19 T3	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.1	0.6	110	0.0	0.1	0.6	112	0.0	51%
83	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.6	26.2	99	0.0	0.3	26.0	102	0.0	51%
84	SCG-RISK-3-C04 T2	Meter and Regulator (M&R) Station Maintenance + Electronic Pressure Monitor (EPM) Maintenance	1	21.3	3.9	50	0.6	19.2	4.2	48	0.6	10%
85	SCG-RISK-3-C06	Meter Set Assembly (MSA) Inspection and Maintenance	10	116.7	1.6	20	3.4	89.4	1.7	22	2.6	23%
86	SCG-RISK-3-C30	MSA Inspection Program	3	11.9	28.7	61	0.3	10.3	30.7	59	0.3	13%
87	SCG-RISK-3-C28	Quality Assurance Program	5	0.5	1.3	100	0.0	0.4	1.3	99	0.0	17%
88	SCG-RISK-3-C05	Regulator Station Replacements/Installs	47	3.4	3.1	77	0.1	1.9	3.1	81	0.1	45%
89	SCG-RISK-3-C18	Residential Meter Protection	40	26.8	12.9	44	0.8	15.5	12.8	52	0.5	42%
90	SCG-RISK-3-C32	Safety Related Field Orders	1	0.7	99.2	97	0.0	0.7	98.2	94	0.0	3%
91	SCG-RISK-3-C12	Valve Inspections and Maintenance	1	35.6	0.5	38	1.0	32.0	0.6	36	0.9	10%
92	SCG-RISK-3-C13	Valve Installs and Replacements	47	2.1	0.7	84	0.1	1.1	0.7	89	0.0	45%
93	SCG-RISK-3-C33	Natural Gas Appliance Testing	1	0.1	4.0	112	0.0	0.1	4.3	110	0.0	10%
94	SCG-RISK-4-C01	Integrity Demonstration, Verification, and Monitoring Practices	2	3.9	54.9	75	0.1	3.9	50.7	72	0.1	-2%
95	SCG-RISK-4-C05 - T1	Storage Field Maintenance - Aboveground Facilities	1	0.5	43.1	101	0.0	0.5	41.5	98	0.0	0%
96	SCG-RISK-4-C05 - T2	Storage Field Maintenance - Aboveground Piping	1	8.8	4.3	66	0.3	8.8	4.1	62	0.3	0%
97	SCG-RISK-4-C05 - T3	Storage Field Maintenance - Underground Components	1	104.0	5.5	22	3.1	104.0	5.2	19	3.1	0%
98	SCG-RISK-4-C06	Compressor Overhauls	5	0.6	17.1	98	0.0	0.7	15.1	95	0.0	-1%
99	SCG-RISK-4-C07	Upgrade to Purification Equipment	1	0.0	12.6	115	0.0	0.1	11.2	114	0.0	-9%
100	HR Prin	HR Prin	35	0.0	126.3	116	0.0	0.0	111.7	116	0.0	33%
101	SCG-RISK-4-C02	Well Abandonment and Replacement	2	2.3	57.4	82	0.1	2.5	50.8	79	0.1	-7%
102	SCG-RISK-4-M1	Facility Integrity Management Program (FIMP)	2.5	0.9	13.8	96	0.0	0.9	12.7	93	0.0	-1%
103	SCG-RISK-5-C10	Workplace Violence Prevention Programs	16	584.2	6.3	3	17.2	411.3	6.6	5	12.1	30%
104	SCG-RISK-5-M02	Industrial Hygiene Program Refresh	1	0.3	1.0	103	0.0	0.3	1.0	101	0.0	9%
105	SCG-RISK-5-M03	Proactive Monitoring and Indoor Air Quality and Chemicals of Concern	1	10.2	0.1	64	0.3	9.3	0.1	61	0.3	9%
106	SCG-RISK-5-M06	Industrial Hygiene Program Expansion	1	44.2	0.2	36	1.3	40.1	0.2	34	1.2	9%
107	SCG-RISK-5-M07	Workplace Violence Prevention Program Enhancements	5	159.6	0.1	17	4.7	134.3	0.1	16	4.0	16%
108	SCG-RISK-5-C02	Drug and Alcohol Testing Programs	1	29.6	0.3	42	0.9	26.9	0.3	41	0.8	9%
109	SCG-RISK-5-C03	Employee Wellness Programs	1	4.8	1.2	71	0.1	4.3	1.3	70	0.1	9%
110	SCG-RISK-5-C04	Employee Safety Training and Awareness Programs	1	28.6	0.7	43	0.8	25.9	0.8	42	0.8	9%
111	SCG-RISK-5-C07	Near Miss, Stop the Job and Jobsite Safety Programs	1	46.4	0.3	35	1.4	42.1	0.4	33	1.2	9%
112	SCG-RISK-5-C08	Safety Culture Programs	1	10.8	0.7	62	0.3	9.8	0.7	60	0.3	9%
113	SCG-RISK-5-C09	Utilizing Industry Best Practices and Benchmarking	1	3.9	1.1	74	0.1	3.5	1.2	73	0.1	9%
114	SCG-RISK-5-M04	Creation of a Safety Video Library	1	24.5	0.1	47	0.7	22.2	0.1	44	0.7	9%
115	SCG-RISK-5-C05	Safe Driving Programs	1	18.2	1.0	52	0.5	16.5	1.1	50	0.5	9%
116	SCG-RISK-7-C01	Contractor Safety Oversight	1	70.3	0.3	30	2.1	63.7	0.3	27	1.9	9%
117	SCG-RISK-7-C02	Third-Party Administration Tools	1	15.0	0.3	56	0.4	13.6	0.4	54	0.4	9%
118	SCG-RISK-7-C03	Contractor Engagement	1	24.8	0.1	46	0.7	22.5	0.1	43	0.7	9%

Table 8. Post Test Year (PTY) RSE and B-C Ratio results for SCG under SCG's approach and TURN's approach (Sorted by Risk)

Row Number	ID	Control/Mitigation Name	Lifetime benefit (years)	Post Test Year RSEs								
				Sempra Values				TURN Revised Values				
				Sempra PTY RSE w/ CFF	Cost (Nominal$ M)	Overall RSE rank	B/C Ratio	Revised PTY RSE	Cost (2024$ M)	Overall RSE rank	B/C Ratio	% Reduction in RSE
1	SCG-RISK-1-C01-T01	Cathodic Protection - Capital	64	391.2	10.0	4	11.5	220.4	8.7	8	6.5	44%
2	SCG-RISK-1-C01-T02	Cathodic Protection - Capital	64	229.9	20.2	8	6.8	129.5	17.6	13	3.8	44%
3	SCG-RISK-1-C02-T01	Cathodic Protection - Maintenance	1	326.3	0.6	5	9.6	359.9	0.5	3	10.6	-10%
4	SCG-RISK-1-C02-T02	Cathodic Protection - Maintenance	1	184.1	1.3	13	5.4	203.0	1.1	10	6.0	-10%
5	SCG-RISK-1-C03-T01	Leak Repair	64	20.8	6.9	44	0.6	11.7	6.0	54	0.3	44%
6	SCG-RISK-1-C03-T02	Leak Repair	64	12.2	14.0	55	0.4	6.9	12.2	61	0.2	44%
7	SCG-RISK-1-C04-T01	Leak Survey & Patrol	1	240.0	1.0	7	7.1	264.7	0.9	6	7.8	-10%
8	SCG-RISK-1-C04-T02	Leak Survey & Patrol	1	71.2	2.1	23	2.1	78.5	1.8	19	2.3	-10%
9	SCG-RISK-1-C05-T01	Pipeline Relocation/Replacement - Capital	64	1.5	23.8	86	0.0	0.9	20.8	88	0.0	44%
10	SCG-RISK-1-C05-T02	Pipeline Relocation/Replacement - Capital	64	0.9	48.5	92	0.0	0.5	42.3	96	0.0	44%
11	SCG-RISK-1-C06-T01	Shallow/Exposed Pipe Remediations	64	199.4	4.6	11	5.9	112.3	4.0	16	3.3	44%
12	SCG-RISK-1-C06-T02	Shallow/Exposed Pipe Remediations	64	128.8	9.3	16	3.8	72.6	8.1	22	2.1	44%
13	SCG-RISK-1-C07-T01	Pipeline Maintenance	1	149.2	1.0	15	4.4	164.5	0.9	12	4.8	-10%
14	SCG-RISK-1-C07-T02	Pipeline Maintenance	1	83.8	2.1	21	2.5	92.5	1.8	17	2.7	-10%
15	SCG-RISK-1-C08-T01	Right of Way	1	2.9	2.6	73	0.1	3.2	2.2	71	0.1	-10%
16	SCG-RISK-1-C08-T02	Right of Way	1	1.6	5.2	85	0.0	1.8	4.6	80	0.1	-10%
17	SCG-RISK-1-C09-T01	Class Location (Hydrotest) - Maintenance	7	27.0	0.9	38	0.8	26.7	0.7	37	0.8	1%
18	SCG-RISK-1-C09-T02	Class Location (Hydrotest) - Maintenance	7	15.0	1.8	51	0.4	14.8	1.5	49	0.4	1%
19	SCG-RISK-1-C10	Compressor Stations - Capital	50	1.3	48.6	89	0.0	0.8	42.4	91	0.0	39%
20	SCG-RISK-1-C11	Compressor Station - Maintenance	1	2.2	16.6	79	0.1	2.5	14.4	75	0.1	-10%
21	SCG-RISK-1-C12-T01	Measurement & Regulation - Capital	46	1.4	45.8	88	0.0	0.9	40.0	89	0.0	38%
22	SCG-RISK-1-C12-T02	Measurement & Regulation - Capital	46	0.8	93.0	94	0.0	0.5	81.1	97	0.0	38%
23	SCG-RISK-1-C13-T01	Measurement & Regulation Station - Maintenance	46	182.2	1.0	14	5.4	113.8	0.8	14	3.3	38%
24	SCG-RISK-1-C13-T02	Measurement & Regulation Station - Maintenance	46	102.9	2.0	19	3.0	64.2	1.7	25	1.9	38%
25	SCG-RISK-1-C14	Odorization	1	0.1	0.9	113	0.0	0.1	0.8	112	0.0	-10%
26	SCG-RISK-1-C15	Security and Auxiliary Equipment	10	1.0	13.5	91	0.0	0.9	11.8	87	0.0	6%
27	SCG-RISK-1-C20	Facility Integrity Management Program (FIMP) - Transmission	2.5	5.3	12.5	62	0.2	5.7	10.9	62	0.2	-7%
28	SCG-RISK-1-C21-T01	Integrity Assessments & Remediation	7	4.5	548.3	63	0.1	4.4	479.9	66	0.1	2%
29	SCG-RISK-1-C21-T02	Integrity Assessments & Remediation	10	4.2	404.7	67	0.1	3.9	353.4	67	0.1	6%
30	SCG-RISK-1-C22-T02.4	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 1B, GRC base)	64	2.5	125.8	78	0.1	1.4	109.7	84	0.0	44%
31	SCG-RISK-1-C22-T03.2	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 2A, GRC base)	64	27.0	45.1	37	0.8	15.2	39.4	47	0.4	44%
32	SCG-RISK-1-C22-T03.4	Pipeline Safety Enhancement Plan - Hydrotesting (Phase 2A, GRC base)	7	2.8	158.6	74	0.1	2.8	138.3	74	0.1	1%
33	SCG-RISK-1-C22-T04.3	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	0.0	0.0	116	0.0	0.0	0.0	116	0.0	0%
34	SCG-RISK-1-C22-T04.4	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	46	0.0	0.0	116	0.0	0.0	0.0	116	0.0	0%
35	SCG-RISK-1-C23-T1	Blythe Compressor Station Modernization	35	0.1	132.3	109	0.0	0.1	115.4	110	0.0	32%
36	SCG-RISK-1-M01-T01	Gas Transmission Safety Rule - MAOP Reconfirmation	9	0.9	415.8	93	0.0	0.8	362.1	90	0.0	4%
37	SCG-RISK-1-M01-T02	Gas Transmission Safety Rule - MAOP Reconfirmation	9	3.2	127.7	71	0.1	3.1	111.2	72	0.1	4%
38	SCG-RISK-1-New-FIMP-Dist	NEW - Facility Integrity Management Program (FIMP) - Distribution	3	4.4	5.4	66	0.1	4.7	4.7	64	0.1	-7%
39	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	19.3	1.7	46	0.6	21.3	1.5	42	0.6	-10%
40	SCG-RISK-3-C04	Meter & Regulator (M&R) Station and Electronic Pressure Monitors (EPM) Inspection and Maintenance	1	452.5	1.0	2	13.3	499.2	0.9	2	14.7	-10%
41	SCG-RISK-3-C05	Regulator Station Installation & Replacement	47	105.1	0.2	17	3.1	65.1	0.2	24	1.9	38%
42	SCG-RISK-3-C07	EPM Installations & Replacements	10	210.1	0.8	10	6.2	197.4	0.7	11	5.8	6%
43	SCG-RISK-3-C08/C17	Leak Survey	3	0.3	4.3	101	0.0	0.3	3.8	101	0.0	-5%
44	SCG-RISK-3-C09	Pipeline Monitoring (Bridge & Span)	1	554.5	0.1	1	16.3	611.7	0.1	1	18.0	-10%
45	SCG-RISK-3-C10	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	1	188.6	0.1	12	5.5	208.0	0.1	9	6.1	-10%
46	SCG-RISK-3-C12	Valve Inspection & Maintenance	1	54.1	0.8	27	1.6	59.7	0.7	27	1.8	-10%
47	SCG-RISK-3-C13	Valve Installs and Replacements	47	3.2	2.4	70	0.1	2.0	2.1	76	0.1	38%
48	SCG-RISK-3-C14	Cathodic Protection- Install / Replace Impressed Current Systems	20	2.5	1.4	77	0.1	2.0	1.2	77	0.1	19%
49	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	10	0.4	0.3	98	0.0	0.4	0.3	98	0.0	6%
50	SCG-RISK-3-C19-T1	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.3	9.1	100	0.0	0.2	7.9	104	0.0	45%
51	Ventura ARE	Ventura ARE	35	0.0	0.0	116	0.0	0.0	0.0	116	0.0	0%
52	Ventura Principal	Ventura Principal	35	0.8	67.4	95	0.0	0.5	60.1	94	0.0	33%
53	SCG-RISK-2-M2	Automate Third Party Excavation Incident Reporting	5	34.9	0.1	31	1.0	35.0	0.1	33	1.0	0%
54	SCG-RISK-2-C12	Damage Prevention Analyst Program	1	26.6	0.4	39	0.8	28.8	0.4	36	0.8	-8%
55	SCG-RISK-2-C16-T01/T02/T03/T04	Public Awareness	1	82.4	0.2	22	2.4	89.3	0.2	18	2.6	-8%
56	SCG-RISK-2-C14	Locating Equipment (HP)	1	19.6	0.6	45	0.6	21.1	0.5	43	0.6	-8%
57	SCG-RISK-2-C04	Locate & Mark Activities (HP)	1	69.9	6.8	24	2.1	75.8	6.0	21	2.2	-8%
58	SCG-RISK-2-C06	Locate and Mark Annual Refresher Training and Competency Program (HP)	1	104.5	0.0	18	3.1	113.3	0.0	15	3.3	-8%
59	SCG-RISK-2-C26	Pipeline Patrol and Pipeline Markers	1	32.9	0.6	34	1.0	35.6	0.6	31	1.0	-8%
60	SCG-RISK-2-C32	Ticket Risk Assessment, and evaluating City permit data	1	4.4	0.1	65	0.1	4.8	0.1	63	0.1	-8%
61	SCG-RISK-2-C15-T01/T02/T03/T04	Public Awareness	1	35.8	0.4	30	1.1	38.7	0.3	29	1.1	-8%
62	SCG-RISK-2-C03	Locate and Mark Activities (MP)	1	10.0	29.0	58	0.3	10.9	25.7	57	0.3	-8%
63	SCG-RISK-2-C05	Locate and Mark Annual Refresher Training and Competency Program (MP)	1	16.2	0.1	50	0.5	17.5	0.1	46	0.5	-8%
64	SCG-RISK-2-C11	Damage Prevention Analyst Program	1	38.2	1.7	29	1.1	41.4	1.5	28	1.2	-8%
65	SCG-RISK-2-C13	Locating Equipment (MP)	5	0.5	2.4	97	0.0	0.5	2.2	95	0.0	0%
66	SCG-RISK-2-M1	Automate Third Party Excavation Incident Reporting	5	62.8	0.1	25	1.8	63.1	0.1	26	1.9	-1%
67	SCG-RISK-3-C10	Pipeline Monitoring (Bridge & Span)	1	10.2	0.1	57	0.3	11.1	0.1	56	0.3	-8%
68	SCG-RISK-3-C11	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	0.25	312.8	0.0	6	9.2	343.9	0.0	5	10.1	-10%
69	SCG-RISK-3-C14	Cathodic Protection – Install/Replace Impressed Current Systems	20	1.9	16.5	81	0.1	1.5	14.7	83	0.0	21%
70	SCG-RISK-3-C03	Cathodic Protection- 100mV Requalification	10	14.8	1.7	52	0.4	13.7	1.5	51	0.4	8%
71	SCG-RISK-3-C01	Cathodic Protection Base Activities	1	1.6	19.3	84	0.0	1.8	17.1	79	0.1	-8%
72	SCG-RISK-3-C02	Cathodic Protection- CP10 Activities	10	3.7	7.9	68	0.1	3.4	7.0	69	0.1	8%
73	SCG-RISK-3-C20	DIMP: Distribution Riser Inspection Project (DRIP)	67	47.8	87.3	28	1.4	26.0	77.7	38	0.8	45%
74	SCG-RISK-3-C21-T2	DIMP: DREAMS- Bare Steel Replacement Program (BSRP)	68	0.1	50.8	111	0.0	0.1	45.3	113	0.0	46%
75	SCG-RISK-3-C21-T1	DIMP: DREAMS- Vintage Integrity Plastic Plan (VIPP)	68	0.2	720.0	103	0.0	0.1	641.0	106	0.0	46%
76	SCG-RISK-3-C22	DIMP: Gas Infrastructure Protection Project (GIPP)- Medium Pressure and High pressure	40	18.4	53.9	47	0.5	11.8	48.0	53	0.3	36%
77	SCG-RISK-3-C23	DIMP: Sewer Lateral Inspection Project (SLIP)	67	1.8	73.6	83	0.1	1.0	65.5	86	0.0	45%
78	SCG-RISK-3-C07	EPM Replacements & Installs	10	12.4	1.1	54	0.4	11.4	1.0	55	0.3	8%
79	SCG-RISK-3-C25	Field Employee Skills Training	5	0.0	10.1	114	0.0	0.0	9.0	114	0.0	-1%
80	SCG-RISK-3-C08/C17	Leak Survey and Main & Service Leak Repair	3	4.4	28.7	64	0.1	4.6	25.5	65	0.1	-4%
81	SCG-RISK-3-C19 T2	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.2	58.0	107	0.0	0.1	51.7	108	0.0	46%
82	SCG-RISK-3-C19 T3	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	0.2	2.1	105	0.0	0.1	1.9	107	0.0	46%
83	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	68	1.1	82.8	90	0.0	0.6	73.7	92	0.0	46%
84	SCG-RISK-3-C04 T2	Meter and Regulator (M&R) Station Maintenance + Electronic Pressure Monitor (EPM) Maintenance	1	17.1	4.9	49	0.5	18.5	4.3	45	0.5	-8%
85	SCG-RISK-3-C06	Meter Set Assembly (MSA) Inspection and Maintenance	10	84.0	2.0	20	2.5	77.6	1.8	20	2.3	8%
86	SCG-RISK-3-C30	MSA Inspection Program	3	8.5	35.7	59	0.3	8.9	31.7	58	0.3	-4%
87	SCG-RISK-3-C28	Quality Assurance Program	5	0.4	1.6	99	0.0	0.4	1.4	99	0.0	-1%
88	SCG-RISK-3-C05	Regulator Station Replacements/Installs	47	2.8	6.4	76	0.1	1.7	5.7	81	0.1	39%

89	SCG-RISK-3-C18	Residential Meter Protection	40	23.4	28.3	40	0.7	15.0	25.2	48	0.4	36%
90	SCG-RISK-3-C32	Safety Related Field Orders	1	0.2	320.5	106	0.0	0.2	285.3	103	0.0	-8%
91	SCG-RISK-3-C12	Valve Inspections and Maintenance	1	28.5	0.7	36	0.8	30.9	0.6	35	0.9	-8%
92	SCG-RISK-3-C13	Valve Installs and Replacements	47	2.1	2.6	80	0.1	1.3	2.3	85	0.0	39%
93	SCG-RISK-3-C33	Natural Gas Appliance Testing	1	0.1	13.1	112	0.0	0.1	11.6	111	0.0	-8%
94	SCG-RISK-4-C01	Integrity Demonstration, Verification, and Monitoring Practices	2	1.5	137.0	87	0.0	1.6	122.1	82	0.0	-6%
95	SCG-RISK-4-C05 - T1	Storage Field Maintenance - Aboveground Facilities	1	0.1	134.4	110	0.0	0.1	119.8	105	0.0	-8%
96	SCG-RISK-4-C05 - T2	Storage Field Maintenance - Aboveground Piping	1	2.8	13.3	75	0.1	3.0	11.9	73	0.1	-8%
97	SCG-RISK-4-C05 - T3	Storage Field Maintenance - Underground Components	1	32.4	17.0	35	1.0	35.0	15.2	34	1.0	-8%
98	SCG-RISK-4-C06	Compressor Overhauls	5	1.9	14.5	82	0.1	1.9	12.9	78	0.1	0%
99	SCG-RISK-4-C07	Upgrade to Purification Equipment	1	0.0	23.8	115	0.0	0.0	21.3	115	0.0	-8%
100	HR Prin	HR Prin	35	0.1	397.5	108	0.0	0.1	361.9	109	0.0	35%
101	SCG-RISK-4-C02	Well Abandonment and Replacement	2	0.5	178.1	96	0.0	0.6	158.7	93	0.0	-6%
102	SCG-RISK-4-M1	Facility Integrity Management Program (FIMP)	2.5	0.2	42.5	104	0.0	0.2	37.8	102	0.0	-5%
103	SCG-RISK-5-C10	Workplace Violence Prevention Programs	16	428.3	7.3	3	12.6	359.0	6.5	4	10.6	16%
104	SCG-RISK-5-M02	Industrial Hygiene Program Refresh	1	0.2	1.1	102	0.0	0.3	1.0	100	0.0	-8%
105	SCG-RISK-5-M03	Proactive Monitoring and Indoor Air Quality and Chemicals of Concern	1	7.6	0.1	61	0.2	8.2	0.1	60	0.2	-8%
106	SCG-RISK-5-M06	Industrial Hygiene Program Expansion	1	33.0	0.2	33	1.0	35.6	0.2	32	1.0	-8%
107	SCG-RISK-5-M07	Workplace Violence Prevention Program Enhancements	5	223.3	0.1	9	6.6	223.7	0.0	7	6.6	0%
108	SCG-RISK-5-C02	Drug and Alcohol Testing Programs	1	21.8	0.4	41	0.6	23.5	0.3	39	0.7	-8%
109	SCG-RISK-5-C03	Employee Wellness Programs	1	3.5	1.4	69	0.1	3.8	1.3	68	0.1	-8%
110	SCG-RISK-5-C04	Employee Safety Training and Awareness Programs	1	21.0	0.8	43	0.6	22.6	0.7	41	0.7	-8%
111	SCG-RISK-5-C07	Near Miss, Stop the Job and Jobsite Safety Programs	1	34.1	0.4	32	1.0	36.8	0.3	30	1.1	-8%
112	SCG-RISK-5-C08	Safety Culture Programs	1	8.0	0.8	60	0.2	8.6	0.7	59	0.3	-8%
113	SCG-RISK-5-C09	Utilizing Industry Best Practices and Benchmarking	1	3.0	1.2	72	0.1	3.3	1.1	70	0.1	-8%
114	SCG-RISK-5-M04	Creation of a Safety Video Library	1	18.0	0.1	48	0.5	19.4	0.1	44	0.6	-8%
115	SCG-RISK-5-C05	Safe Driving Programs	1	11.1	1.2	56	0.3	12.0	1.0	52	0.4	-8%
116	SCG-RISK-7-C01	Contractor Safety Oversight	1	61.3	0.3	26	1.8	66.2	0.3	23	1.9	-8%
117	SCG-RISK-7-C02	Third-Party Administration Tools	1	13.1	0.4	53	0.4	14.1	0.3	50	0.4	-8%
118	SCG-RISK-7-C03	Contractor Engagement	1	21.6	0.1	42	0.6	23.3	0.1	40	0.7	-8%

Appendix E: Sempra Discovery Responses Relied on in Testimony

Data Request Number: TURN-SEU-010

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Proceeding Number: A2205015_016 2024 GRC

Publish To: The Utility Reform Network

Date Received: 11/14/2022

Date Responded: 11/30/2022

1. In calculating RSEs for the GRC, please explain how the Sempra Utilities complied with the requirement in Row 25 of the S-MAP Settlement adopted in D.18-12-014 that: "The values in the numerator and denominator should be present values to ensure the use of comparable measurements of benefits and costs." The explanation should include a detailed discussion of how benefits in the numerator and costs in the denominator were discounted as necessary to achieve present values, what discount rates were used, and why those discount rates were used.

SEU Response 1:

SoCalGas and SDG&E refer TURN to their filing in the Risk Assessment Mitigation Phase (RAMP) proceeding, RAMP-C Risk Quantification Framework and Risk Spend Efficiency,[1] which details the Companies' process for discounting of benefits and discounting of costs. The Settlement Decision mandates a present value calculation for future risk reduction benefits and costs. The Companies meet this requirement by applying a "discount" rate to the difference in the risk score for benefits. In the GRC, and consistent with the RAMP proceeding, SoCalGas and SDG&E use a 3% discount rate for purposes of determining the present value of the risk reduction benefits or numerator of the RSE calculation. This rate was determined based on federal recommendations.[2] Federal recommendations are an appropriate resource to determine a specified discount rate for benefits. For example, SoCalGas and SDG&E adhere to the 49 Code of Federal Regulations Part 192 and are Federally and State regulated. Further, SPD and parties are currently in the process of changing the entire Value Framework where federally accepted values are to be prescribed to SoCalGas and SDG&E for purposes of risk assessment.

[1] A.21-05-011 RAMP-C Risk Quantification Framework and Risk Spend Efficiency (May 17, 2021), p. C-31, *available at* SCG_SDGE_RAMP-C-Risk-Quantification-Framework-Risk-Spend-Efficiency-5-17-21.pdf (socalgas.com).

[2] *See* A.21-05-011 RAMP-C at C-32.

SEU Response 1:-Continued

For costs, SoCalGas and SDG&E present GRC forecasts in base year (2021), direct constant dollars, consistent with the GRC's Rate Case Plan. The Rate Case Plan, D.07-07-004 Attachment A at A-31, prescribes the cost presentation in GRCs: "All data for expenses shall be stated in recorded dollars and dollars inflation adjusted to a constant base year." This means that even in the years after the base year (2021 in this proceeding), no adjustments are provided for escalation, inflation, or loaders. Further discounting costs to today or "present value" is not needed because GRC forecasts are already in today's 2021 constant dollars. This is consistent with the RAMP proceeding,[3] which used 2020 recorded costs. SoCalGas and SDG&E believe that the "comparable measurements" and "present values" language in the Settlement Decision is consistent with the Rate Case Plan's requirement to present all costs in base year, constant dollars.

[3] *See* A.21-05-011 RAMP-C at C-31; *see also* Informal Comments of The Utility Reform Network (TURN) To the Safety Policy Division on the Sempra Utilities' RAMP Report (October 22, 2021), p. 25 (quoting from SoCalGas and SDG&E data request response).

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2. SDG&E-SCG-3, Chapter 2, p. RSP/GSF-23 states: "Appendix B to this testimony contains a list compiled by the Companies of each party's recommended change to the 2021 RAMP Reports for inclusion in the TY 2024 GRC, and the Companies' response to those recommendations." However, Appendix B does not respond to Section 3.2 of TURN's October 22, 2021 Informal Comments (Failure to Properly Discount the Values in the RSE Calculation) and associated recommendation 4 in the Appendix to those comments, which TURN reiterated in Section II(G) of its December 6, 2021 formal comments in A.21-05-011

a. Why didn't the Companies address this recommended change?

b. Please provide a detailed response to TURN's recommended change, including a response to the supporting analysis for TURN's recommendation that was presented in TURN's informal comments.

SEU Response 2:

a. The Companies inadvertently missed this recommendation in preparing Appendix B; however, please refer to the response to Question 1. In addition, the Companies addressed TURN's position in its RAMP Report in Chapter SCG/SDG&E-RAMP-E (Lessons Learned) at SCG/SDG&E-RAMP-E-25:

TURN, however, provided its view that all costs should be discounted at the weighted average cost of capital (WACC), on the grounds that escalation and discounting are different. The Companies revisited this topic in preparing their 2021 RAMP Reports and agree with TURN that escalation and discounting are different concepts. While the Companies are not opposed to the concept of discounting, TURN′s suggestion to discount all costs at the WACC does not represent differences in utility costs. For example, O&M costs are different from capital costs. One such difference is that O&M expenditures do not earn a rate of return. Therefore, it may be inaccurate to discount O&M costs at the WACC. Prior to the implementation in a RAMP or GRC filing, questions should be addressed as to the types of costs subject to discounting. The Companies maintain that their use of base year, constant dollars is appropriate and consistent with the Settlement Decision and the Rate Case Plan; however, additional discussion of discounting costs could be further discussed with interested stakeholders in the S-MAP OIR.

Data Request Number: TURN-SEU-010

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Proceeding Number: A2205015_016 2024 GRC

Publish To: The Utility Reform Network

Date Received: 11/14/2022

Date Responded: 11/30/2022

SEU Response 2:-Continued

b. Please refer to SoCalGas and SDG&E's response to Question 1 and Question 2(a). In addition, SoCalGas and SDG&E perform their RSE calculations as dividing discounted risk reduction (aka benefits) by estimated pre-inflation adjusted risk mitigation expenses. Since risk reduction is discounted by the proxy inflation rate, the calculated RSE represents an apples-to-apples comparison between risk reductions and risk mitigation expenses. Not discounting costs (the denominator) is due to the costs already being pre-inflation adjusted amounts. If SoCalGas and SDG&E calculated present value of the costs, it would escalate the costs at the proxy inflation rate then discount it at the same rate, which would yield the same value as it begins with. Therefore, the current RSE methodology uses more efficient calculations to compute present value of benefits and costs. Further, WACC is widely used as a discount rate to calculate present value of a stream of cash flow (i.e., time value of money), to determine if energy projects meet/exceed the financial return requirements. As explained in response to Question 1, GRCs present projects/programs in base year direct constant dollars. Direct dollars are the cost of a project/program (including vacation and sick) and excludes loaders (e.g., medical), taxes, and rate of return. GRC project forecasts do not utilize the corporate financial return to analyze risk mitigation activities. Accordingly, RSEs in a GRC context measures the risk reduction per dollar from a societal interest perspective. Hence, the long-term proxy inflation rate would be an appropriate discount rate to use, which is not present in GRC cost estimates. SoCalGas and SDG&E's discounting approach is to conduct a fair comparison between risk reduction and pre-inflation adjusted risk mitigation expenses and is consistent with the GRC framework.

Data Request Number: TURN-SEU-018

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: The Utility Reform Network

Date Received: 1/24/2023

Date Responded: 2/2/2023

3. For each capital program in this GRC for which an RSE is calculated, please provide the total annual revenue requirement for the program, for the full depreciation life of the proposed assets to be installed.

SEU Response 3:

SoCalGas and SDG&E object to this request pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure on the grounds that it seeks the production of information that is neither relevant to the subject matter involved in the pending proceeding nor is likely reasonably calculated to lead to the discovery of admissible evidence. SoCalGas also objects to this request to the extent it imposes upon SoCalGas an obligation to generate or create records that do not exist, or which have not been generated or created in its regular course of business. This purported obligation exceeds the requirements provided by the CPUC's Discovery Custom and Practice Guidelines and California Code of Civil Procedure Section 2031.230 (proper response stating inability to comply with discovery request includes a statement that "the particular item or category [of records] has never existed"). *See also* A.05-04-020, *In the Matter of the Joint Application of Verizon Communications Inc. and MCI, Inc.*, Administrative Law Judge's Ruling Addressing Motion of Qwest to Compel Responses, Aug. 5, 2005, at 7 (in relation to motion to compel emphasized that "Verizon is not required to create new documents responsive to the data request") (also available at 2005 WL 1866062); A.05-02-027, *In the Matter of the Joint Application of SBC Communications Inc. and AT&T Corp.*, Administrative Law Judge's Ruling Regarding ORA's Second Motion to Compel, June 8, 2005, at 23 (in ruling on motion to compel stressed that SBC Communications "shall not be required to produce new studies specifically in response to this DR") (also available at 2005 WL 1660395). Subject to and without waiving the foregoing objections, SoCalGas and SDG&E respond as follows:

SoCalGas and SDG&E do not calculate the revenue requirement at the project or program level during the course of the General Rate Case proceeding. Further, revenue requirements are calculated only for the Test Yest and Post-Test Year (PTY) periods at the total company level. The only exceptions are the PTY specific capital projects proposed and discussed in Exhibits SCG-40-2R and SDG&E-45-R.

3. Please provide the escalation rate, according to Sempra's proposal, that should be utilized for each year and cost category listed in the attached spreadsheet ("TURN Attachment 1_Escalation factors).

SDG&E Response 3:

SDG&E assumes Sempra as used in this request is referring to SDG&E.

Refer to the excel file "TURN-SEU-030_Q3_SDGE.xlsx" for the requested escalation factors.

Data Request Number: TURN-SEU-030

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: The Utility Reform Network

Date Received: 2/8/2023

Date Responded: 2/23/2023

3. Please provide the escalation rate, according to Sempra's proposal, that should be utilized for each year and cost category listed in the attached spreadsheet ("TURN Attachment 1_Escalation factors).

SoCalGas Response 3:

SoCalGas assumes Sempra as used in this request is referring to SoCalGas.

Please see the separately attached excel file "TURN-SEU-030_Q3_SoCalGas.xlsx".

Note: in the template provided for SoCalGas, columns E-H and columns I-L were both labeled "Capital Cost Escalation Relative to 2021". SoCalGas updated the label on columns I-L to read "O&M Cost Escalation Relative to 2021" to reflect the data provided.

TURN-30_Q3_SDGE

SDGE RSE IDs and Control/Mitigation Names

			Capital Cost Escalation Factor from 2021 Dollars				O&M Cost Escalation Factor from 2021 Dollars			
Type	**ID**	**Control/Mitigation Name**	2024	2025	2026	2027	2024	2025	2026	2027
Electric Infrastructure Integrity	SDG&E-Risk-2-C1	Overhead Public Safety (OPS) Program	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C3	4kV Modernization Program – Distribution	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C4	Distribution Overhead Switch Replacement Program	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C6	Tree Trimming (non-HFTD)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Electric Infrastructure Integrity	SDG&E-Risk-2-C8	Aviation Protection Program	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C10-T1-T2	Underground Cable Replacement Program (Proactive)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C10-T3	Underground Cable Replacement Program (Proactive) – North Harbor Project	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C11	Tee Modernization Program	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C13	Replacement of Live Front Equipment - Proactive	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C14	DOE Switch Replacement – Underground	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C15	GO165 Corrective Maintenance Program – Underground	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C16	GO 165 Manhole, Vault Restoration Program	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C18 - T1	Distribution Circuit Reliability - Underground	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C18 -T2	Distribution Circuit Reliability - Overhead	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C20 -T2	Substation Reliability for Distribution Components – Bernardo 12kV Breakers Replac	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C20-T5	Substation Reliability for Distribution Components – Miramar 12kV Replacements	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C20-T8	Substation Reliability for Distribution Components – Coronado 69/12kV Transforme	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C21	Distribution Substation Obsolete Equipment	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C24	Urban Substation Rebuild	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C28	Field SCADA RTU Replacement	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C29-T1	SCADA Capacitors - Overhead	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-C29-T2	SCADA Capacitors - Undergroundf	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 01	Mission 12KV Replacements	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 02	Stuart 12kV Transformer Replacement	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 03	La Jolla 69/12kV Transformer Replacement	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 04	Poway 69kV Substation Rebuild	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 05	San Marcos Substation 69kV Rebuild & 12kV Switchgear	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 06	Substation Modification To Support FLISR	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 07	Torrey Pines 12kV Breaker Replacements	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 08	El Cajon 12kV Breaker Replacements	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Electric Infrastructure Integrity	SDG&E-Risk-2-New 09	Strategic Pole Replacement Program (Non-HFTD)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-M04	Adobe Falls Relocation Project	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C01-T01	Cathodic Protection - Capital - HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C01-T02	Cathodic Protection - Capital - Non-HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C02-T01	Cathodic Protection - Maintenance - HCA	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C02-T02	Cathodic Protection - Maintenance - Non-HCA	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C09	Compressor Station - Maintenance	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C08	Compressor Stations - Capital	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-M02-T01	Gas Transmission Safety Rule - MAOP Reconfirmation - HCA	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-M02-T02	Gas Transmission Safety Rule - MAOP Reconfirmation - Non-HCA	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C15-T01	Integrity Assessments & Remediation - HCA	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C15-T02	Integrity Assessments & Remediation - Non-HCA	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C03-T01	Leak Repair - HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C03-T02	Leak Repair - Non-HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C10-T01	Measurement & Regulation Station – Capital - HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C10-T02	Measurement & Regulation Station – Capital - Non-HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C11-T01	Measurement & Regulation Station – Maintenance - HCA	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C11-T02	Measurement & Regulation Station – Maintenance Non-HCA	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C12	Odorization	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C06-T01	Pipeline Maintenance - HCA	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C06-T02	Pipeline Maintenance - Non-HCA	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C04-T01	Pipeline Relocation/Replacement - HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C04-T02	Pipeline Relocation/Replacement - Non-HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C13	Security and Auxiliary Equipment	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C05-T01	Shallow/Exposed Pipe Remediations - HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-C05-T02	Shallow/Exposed Pipe Remediations - Non-HCA	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C05	Reg Station Replacement Program	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C01	Cathodic Protection - O&M	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	Moreno Principal	Moreno Principal	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-New-FIMP-Dist	NEW - Facility Integrity Management (FIMP)- Distribution	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the High Pressure System (Excluding Dig-in)	SDG&E-RISK-3-New-FIMP-Trans	NEW - Facility Integrity Management (FIMP)- Transmission	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Involving a Contractor	SDG&E-Risk-4-C1	Contractor Oversight Program	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Involving a Contractor	SDG&E-Risk-4-C2	Field Safety Oversight	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Involving a Contractor	SDG&E-Risk-4-M2	Enhanced Verification of Class 1 Contractor Employee Specific Training	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C16-T1/T2/T3/T4	Public Awareness	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C04	Locate & Mark Activities (HP)	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C12	Damage Prevention Analyst Program	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-M2	Automate Third Party Excavation Incident Reporting	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-M1	Automate Third Party Excavation Incident Reporting	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C11	Damage Prevention Analyst Program	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C03	Locate and Mark Activities*	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C09	Locate and Mark Quality Assurance	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C13	Locating Equipment	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Excavation Damage (Dig-In) on the Gas System	SDG&E-RISK-7-C15-T1/T2/T3/T4	Public Awareness	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-C3	Strong Safety Culture	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-C4	Employee Behavioral Accident Prevention Process Program	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-C8	OSHA Voluntary Protection Program	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-C9	Safe Driving Programs	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-C13	Enhanced Mandatory Employee Training (OSHA): Certified Occupational Safety Speci	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-C14	Enhanced Safety in Action Program	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-C15	Enhanced Employee Safe Driving Training	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-M1	Purchasing and testing more protective respiratory protection for wildfire smoke pa	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E-Risk-8-M2	Purchasing break/rest trailers with filtered air systems to reduce wildfire smoke expo	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Involving an Employee	SDG&E RISK 8-C16	Energized Skills Training and Testing Yard	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Involving an Employee	SDG&E Risk 8-New01	Industrial Athletic Trainer	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C02	Cathodic Protection Program - Capital	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C01	Cathodic Protection Program - O&M	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C12	Cathodic Protection System Enhancements - Base	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C10	Code Compliance Mitigation	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C21	CSF Quality Assurance (QA) Program	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C06 T1	Leak Repair	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C06 T2	Leak Repair	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C06 T3	Leak Repair	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C06 T4	Leak Repair	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C19	Field and Public Safety	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134

Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C11 - T1	Gas Distribution Emergency Department - Mains	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C11 - T2	Gas Distribution Emergency Department - Service	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C16-T01	DIMP – DREAMS – Vintage Integrity Plastic Plan (VIPP)	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C14	Human Factors Mitigations - Operator Qualification Training and Certification	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C20	Natural Gas Appliance Testing (NGAT) or Carbon Monoxide Testing	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C03	Piping in Vaults Replacement Program	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C05	Regulator Station Replacement	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C04	Regulator Station, Valve, and Large Meter Set Inspection	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C09-T01	Early Vintage Program (Components) - Oil Drip Piping Removal	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C09-T02	Early Vintage Program (Components) - Dresser Mechanical Coupling Removal	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C09-T03	Early Vintage Program (Components) - Removal of Closed Valves between High/Medi	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-M03	Replace Curb Valves with EFVs	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C07	Pipeline Monitoring (Leak Mitigation, Bridge & Span, Unstable Earth, and Pipeline P	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C08-T03	Underperforming Steel Replacement Program – Other Steel (Post 1965 vintage)	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C08-T01	Underperforming Steel Replacement Program – Threaded Main (pre-1933 vintage)	0.987	0.979	0.995	1.018	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-C08-T02	Underperforming Steel Replacement Program (1934-1965 vintage)	N/A	N/A	N/A	N/A	1.077	1.086	1.109	1.134
Incident Related to the Medium Pressure System (Excluding Dig-in)	SDG&E-RISK-9-M04	New RAMP Mitigation: MSAs inside Bldgings and Alcoves	0.987	0.979	0.995	1.018	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators -(HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C03-T1-T3	Wireless Fault Indicators- (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C06/M1 T2	SCADA Capacitors - (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C06/M1-T2	SCADA Capacitors - (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C12/M7-T1-T2	Hotline Clamps (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C13/M8-T1-T2	Resiliency Grant Programs (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C14/M9-T1-T2	Standby Power Programs (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C15/M10-T1-T2	Resiliency Assistance Programs (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C16/M11-T1-T2	Strategic Undergrounding (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C17/M12-T1-T3	Overhead Distribution Fire Hardening – Bare Conductor (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C18/M13-T1-T2	Overhead Transmission Fire Hardening – Distribution Underbuilt (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C21/M14-T1	Lightning Arrestor Removal/Replacement Program (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C7/M2-T1	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C7/M2-T2	Overhead Distribution Fire Hardening – Covered Conductor (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C9/M4-T1	PSPS Sectionalizing (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C9/M4-T2	PSPS Sectionalizing (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C10/M5-T2	Microgrids (HFTD Tier 2)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C11/M6-T1	Advanced Protection (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 3)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C22-T1-T2	Distribution System Inspection – CMP – 5 Year Detailed Inspections (HFTD Tier 2)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 3)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C30-T1-T2	Distribution System Inspection – CMP – Annual Patrol (HFTD Tier 2)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C24-T1-T2	Distribution System Inspection – IR/Corona (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C25-T2	Distribution System Inspection – CMP – 10 Year Intrusive (HFTD Tier 2)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C27	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 3)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C27-T2	Distribution System Inspection – HFTD Tier 3 Inspections (HFTD Tier 2)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C28-T1-T2	Distribution System Inspection – Drone Inspections (HFTD Tier 2)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A
Wildfire	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C33/M16-T1-T2	Enhanced Vegetation Management (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C34-T1-T3	Pole Brushing (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C32/M15-T1-T2	Fuel management and reduction of "slash" from vegetation management activities (	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C36-T1-T2	Wildfire Infrastructure Protection Teams (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 3)	1.113	1.127	1.146	1.170	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C35-T1-T3	Aviation Firefighting Program (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 3)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-1-C31-T1-T2	Detailed Inspection of Vegetation (HFTD Tier 2)	N/A	N/A	N/A	N/A	1.068	1.086	1.109	1.134
Wildfire	SDG&E-Risk-2-C08-T1	Avian Protection (HFTD Tier 3)	1.113	1.127	1.146	1.170	N/A	N/A	N/A	N/A

SCG RSE IDs and Control/Mitigation Names

			Capital Cost Escalation Relative to 2021				O&M Cost Escalation Relative to 2021			
							~~Capital Cost Escalation Relative to 2021~~			
Type	ID	Control/Mitigation Name	2024	2025	2026	2027	2024	2025	2026	2027
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C01-T01	Cathodic Protection - Capital	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C01-T02	Cathodic Protection - Capital	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C02-T01	Cathodic Protection - Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C02-T02	Cathodic Protection - Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C03-T01	Leak Repair	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C03-T02	Leak Repair	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C04-T01	Leak Survey & Patrol	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C04-T02	Leak Survey & Patrol	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C05-T01	Pipeline Relocation/Replacement - Capital	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C05-T02	Pipeline Relocation/Replacement - Capital	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C06-T01	Shallow/Exposed Pipe Remediations	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C06-T02	Shallow/Exposed Pipe Remediations	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C07-T01	Pipeline Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C07-T02	Pipeline Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C08-T01	Right of Way	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C08-T02	Right of Way	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C09-T01	Class Location (Hydrotest) - Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C09-T02	Class Location (Hydrotest) - Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C10	Compressor Stations - Capital	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C11	Compressor Station - Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C12-T01	Measurement & Regulation - Capital	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C12-T02	Measurement & Regulation - Capital	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C13-T01	Measurement & Regulation Station - Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C13-T02	Measurement & Regulation Station - Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C14	Odorization	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C15	Security and Auxiliary Equipment	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C20	Facility Integrity Management Program (FIMP) - Transmission	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C21-T01	Integrity Assessments & Remediation	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C21-T02	Integrity Assessments & Remediation	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C22-T02.4	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 1B, GRC base)	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C22-T03.2	Pipeline Safety Enhancement Plan - Pipeline Replacement (Phase 2A, GRC base)	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C22-T03.4	Pipeline Safety Enhancement Plan - Hydrotesting (Phase 2A, GRC base)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C22-T04.3	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C22-T04.4	Pipeline Safety Enhancement Plan - Valve Enhancement (GRC base)	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-C23-T1	Blythe Compressor Station Modernization	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-M01-T01	Gas Transmission Safety Rule - MAOP Reconfirmation	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-M01-T02	Gas Transmission Safety Rule - MAOP Reconfirmation	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-1-New-FIMP-Dist	NEW - Facility Integrity Management Program (FIMP) - Distribution	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C01	Cathodic Protection Base Activities	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C04	Meter & Regulator (M&R) Station and Electronic Pressure Monitors (EPM) Inspection and Mainten	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C05	Regulator Station Installation & Replacement	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C07	EPM Installations & Replacements	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C08/C17	Leak Survey	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C09	Pipeline Monitoring (Bridge & Span)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C10	Pipeline Monitoring (Pipeline Patrol, Bridge & Span Inspections, Unstable Earth Inspection)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C12	Valve Inspection & Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C13	Valve Installs and Replacements	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C14	Cathodic Protection- Install / Replace Impressed Current Systems	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	SCG-RISK-3-C19-T1	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	Ventura ARE	Ventura ARE	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the High Pressure System (Excluding Dig-in)	Ventura Principal	Ventura Principal	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-M2	Automate Third Party Excavation Incident Reporting	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C12	Damage Prevention Analyst Program	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C16-T01/T02/T	Public Awareness	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C14	Locating Equipment (HP)	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C04	Locate & Mark Activities (HP)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C06	Locate and Mark Annual Refresher Training and Competency Program (HP)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C26	Pipeline Patrol and Pipeline Markers	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C32	Ticket Risk Assessment, and evaluating City permit data	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C15-T01/T02/T	Public Awareness	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C03	Locate and Mark Activities (MP)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C05	Locate and Mark Annual Refresher Training and Competency Program (MP)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C11	Damage Prevention Analyst Program	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-C13	Locating Equipment (MP)	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Excavation Damage (Dig-In) on the Gas System	SCG-RISK-2-M1	Automate Third Party Excavation Incident Reporting	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C01	Cathodic Protection Base Activities	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C02	Cathodic Protection- CP10 Activities	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C20	DIMP: Distribution Riser Inspection Project (DRIP)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C21-T2	DIMP: DREAMS- Bare Steel Replacement Program (BSRP)	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C21-T1	DIMP: DREAMS- Vintage Integrity Plastic Plan (VIPP)	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C22	DIMP: Gas Infrastructure Protection Project (GIPP)- Medium Pressure and High pressure	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C23	DIMP: Sewer Lateral Inspection Project (SLIP)	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C07	EPM Replacements & Installs	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C25	Field Employee Skills Training	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C08/C17	Leak Survey and Main & Service Leak Repair	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C19 T2	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C19 T3	Main Replacements- Leakage, Abnormal Op. Conditions, CP Related	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C16	Service Replacements- Leakage, Abnormal Op. Conditions, CP Related	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C04 T2	Meter and Regulator (M&R) Station Maintenance + Electronic Pressure Monitor (EPM) Maintenanc	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C06	Meter Set Assembly (MSA) Inspection and Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C30	MSA Inspection Program	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C28	Quality Assurance Program	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C05	Regulator Station Replacements/Installs	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C18	Residential Meter Protection	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C32	Safety Related Field Orders	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C12	Valve Inspections and Maintenance	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C13	Valve Installs and Replacements	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Medium Pressure System (Excluding Dig-in)	SCG-RISK-3-C33	Natural Gas Appliance Testing	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-C01	Integrity Demonstration, Verification, and Monitoring Practices	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-C05 - T1	Storage Field Maintenance - Aboveground Facilities	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-C05 - T2	Storage Field Maintenance - Aboveground Piping	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-C05 - T3	Storage Field Maintenance - Underground Components	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-C06	Compressor Overhauls	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-C07	Upgrade to Purification Equipment	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Storage System (Excluding Dig-in)	HR Prin	HR Prin	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-C02	Well Abandonment and Replacement	0.9874	0.9786	0.9954	1.0177	N/A	N/A	N/A	N/A
Incident Related to the Storage System (Excluding Dig-in)	SCG-RISK-4-M1	Facility Integrity Management Program (FIMP)	0.9874	0.9786	0.9954	1.0177	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-M04	Creation of a Safety Video Library	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C02	Drug and Alcohol Testing Programs	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C04	Employee Safety Training and Awareness Programs	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C03	Employee Wellness Programs	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-M06	Industrial Hygiene Program Expansion	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-M02	Industrial Hygiene Program Refresh	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C07	Near Miss, Stop the Job and Jobsite Safety Programs	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-M03	Proactive Monitoring and Indoor Air Quality and Chemicals of Concern	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C05	Safe Driving Programs	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C08	Safety Culture Programs	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C09	Utilizing Industry Best Practices and Benchmarking	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-M07	Workplace Violence Prevention Program Enhancements	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving an Employee	SCG-RISK-5-C10	Workplace Violence Prevention Programs	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving a Contractor	SCG-RISK-7-C01	Contractor Safety Oversight	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving a Contractor	SCG-RISK-7-C02	Third-Party Administration Tools	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530
Incident Involving a Contractor	SCG-RISK-7-C03	Contractor Engagement	N/A	N/A	N/A	N/A	1.0732	1.0995	1.1255	1.1530

Appendix F: TURN October 22, 2021 Informal Comments to the CPUC's Safety Policy Division in the Sempra RAMP, A.21-05-011

Informal Comments of The Utility Reform Network (TURN)
To the Safety Policy Division on the Sempra Utilities' RAMP Report

The Utility Reform Network (TURN) appreciates this opportunity to provide the Safety Policy Division (SPD) with our comments on the Sempra Utilities' RAMP Reports, which we hope will aid SPD with its November 5, 2021 report on the Sempra Utilities' RAMP filings.[1]

A summary of TURN's recommendations appears in the Appendix to these comments.

1. The Sempra Utilities Fail to Use the End of 2023 as the Baseline for Their Risk Analysis, Contrary to the SMAP Settlement

The SMAP Settlement requires the Sempra Utilities to use subject matter expert (SME) estimates of the risk reduction that will be achieved at the end of 2023 as the baseline for the pre-mitigation risk scores that are used to calculate RSEs. Specifically, Rows 10 and 11 of the Settlement require the Sempra Utilities to use "SME judgment that takes into account the benefits of any mitigations that are expected to be implemented prior to the GRC period under review." Sempra's Test Year 2024 GRC will be setting revenue requirements for the period 2024 through 2027. Moreover, the Sempra Utilities will move ahead with their planned mitigations in 2021 through 2023 and will not be basing their deployment of mitigations in those years on the upcoming decision on the 2024 Test Year GRC request, which is unlikely to come until the end of 2023 at the earliest. Accordingly, in this case, "the GRC period under review" begins in 2024.

Nevertheless, in direct violation of the Settlement, the Sempra Utilities chose to use 2020 as the baseline year to determine pre-mitigation risk scores.[2] As a result, Sempra's RSEs are inflated by counting risk reductions that will already have been achieved by work that the Sempra Utilities plan to perform in 2021, 2022 and 2023. For example, SDG&E plans to significantly accelerate its Wildfire mitigation undergrounding program from 29 and 25 miles in 2020 and 2021 respectively[3] to 80 miles in 2022 and 125 miles in 2023.[4] Using 2020 as the baseline means that 230 miles of undergrounding – and the attendant significant risk reduction --

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[1] Because of the expedited nature of RAMP proceedings and the failure of the Sempra Utilities to provide the supporting information required by Row 29 of the SMAP Settlement (see Section 5 below), the risks that TURN was able to review was not as comprehensive as TURN would have liked. The omission of a discussion of any issue with any risk chapter should not be construed as TURN's view that the presentation and analysis was satisfactory.

[2] SCG/SDG&E RAMP E-17.

[3] SDG&E 1-41.

[4] June 17, 2021 Workshop, Slide 79.

is not reflected in SDG&E's pre-mitigation aggregate risk score. As another example, when the Commission is deciding in the GRC whether and in what scope to approve the use of covered conductor for 2024 and beyond, the RSE analysis should not include covered conductor work and attendant risk reduction benefits that will have already been achieved before 2024. Because it is reasonable to expect declining marginal benefits as such programs are extended into lower priority parts of the utility system, it is essential that RSEs not be inflated by counting benefits that will already have been attained.

In addition, for the granular tranche RSEs required by the Settlement (discussed below), SDG&E's use of a 2020 baseline means that SDG&E's RSEs will reflect work that will already have been performed by the time the GRC decision is issued. In effect, in their RSE justification for mitigations proposed in their 2024 GRC, the Sempra Utilities would be able to double count risk reduction benefits that will have already been achieved. The result would be to benefit the utility at the expense of ratepayers by artificially inflating the benefits that can be achieved by mitigation activities in the upcoming GRC period.

This is a clear-cut case of a failure to comply with an explicit provision of the Settlement in Rows 10 and 11. The Sempra Utilities' arguments based on the Rate Case Plan are completely beside the point. Nothing in the Settlement indicates that the Rate Case Plan procedures for providing cost forecasts are to have any effect on the Settlement's requirements for calculating pre-mitigation risk scores and for the baseline for calculating risk reduction. The Sempra Utilities agreed to this provision and must be held to it. Moreover, the failure to use baselines updated by SME judgment (which under Row 29 of the Settlement is to be made transparent and thus subject to review and analysis by the parties) would make the RAMP a stale exercise that fails to reflect the best estimate of the risks facing the utilities as they enter into the GRC test year.

Accordingly, TURN urges SPD to make a clear and unequivocal finding in its upcoming report that the Sempra Utilities' use of the incorrect baseline violates the requirements of Rows 10 and 11 of the Settlement and must be corrected for the RSE analysis that the utilities present in their 2024 GRC submission and accompanying workpapers. Specifically, SPD should find that, in order to comply with the Settlement and as a matter of sound policy, the Sempra Utilities must use the end of 2023 as the baseline for the RSE analysis in the GRC.[5] TURN respectfully

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[5] TURN notes that in response to TURN Data Request 7, the Sempra Utilities purported to provide recalculated RSEs for two risks using a 2023 baseline. The response to that data request provides a lengthy and difficult to understand discussion of assumptions that were used for the exercise – a discussion that raises more questions than it answers. Ultimately, it is unclear to TURN whether the Sempra Utilities used a reasonable methodology and assumptions in responding to that data request. Moreover, the recalculated Wildfire risk RSEs are not provided for the granular tranches required by the Settlement (as discussed below) and

requests that SPD be clear and unequivocal about these findings so that the Sempra Utilities will know that, if they continue to use the wrong baseline, they will be defying an SPD conclusion.

2. The Sempra Utilities Have Failed to Comply with the Tranche Granularity Requirements of the Settlement

One of the most important requirements of the Settlement is the requirement to calculate, for each Risk Event (i.e., for each risk), RSEs for each tranche of the system or assets that are relevant to that risk. In this section, TURN will discuss the Settlement's specific requirements for tranche granularity, and how the Sempra Utilities have failed to comply with these requirements, both as a general matter and by reference to certain key risks. TURN's resource limitations prevented it from reviewing the granularity of Sempra's analysis for all risks. The fact that these comments do not address certain risks does not mean that TURN views the granularity of tranches for those risks to satisfy the Settlement's requirements.

2.1. The Settlement's Requirements for Tranche Granularity

Row 14 of the Settlement requires, "for each Risk Event, the utility [to] subdivide the group of assets or the system associated with the risk into tranches." The last paragraph of Row 14 provides the principal that the utility is to use in determining the composition of the tranches. Each element in an identified tranche is to "have homogeneous risk profiles (i.e., considered to have the same LoRE and CoRE)." In other words, to comply with the Settlement, all of the assets in each tranche should be grouped so that there are no significant differences in either the LoRE or the CoRE of those assets. If there is a meaningful difference, the asset group needs to be broken out into more granular tranches.

In addition, Row 14 requires the determination of tranches to be "based on how the risks and assets are managed by each utility, data availability and model maturity." This requirement means that data that the utility uses to manage the risk and prioritize the execution of mitigations must be used in the determination of the tranches. As Row 14 states, the utility must strive to achieve as deep a level of granularity as reasonably possible.

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therefore fail to reflect the fact that SDG&E should already have addressed the highest risk tranches in work performed through 2023 and therefore fails to show how the tranche specific RSEs are reduced when 2023 is used as the baseline, instead of 2020. This data request response highlights the need for the Sempra Utilities to do a better job of explaining their data inputs and assumptions when they provide RSEs calculated with the 2023 baseline in their GRC submission – as well as the need to comply with the Settlement's tranche granularity requirements.

The Settlement explains why its Tranche requirements are important. The utility is required to calculate "[r]isk reductions from mitigations and risk spend efficiencies at the Tranche level" in order to "give[] a more granular view of how mitigations will reduce risk."

Finally, Row 14 includes a requirement for the utility to explain for each risk how the utility determined the tranches. Specifically, in its RAMP submission, the utility must provide its "rationale for the determination of Tranches, or for a utility's determination that no Tranches are appropriate for a given Risk Event."

As discussed below, the Sempra Utilities routinely fail to satisfy this requirement in the various risk chapters in their RAMP submissions.

2.2. Importance of the Granularity Requirement

2.2.1. Summary

The Commission's adoption of the SMAP Settlement alone shows that all of the required elements included in that Settlement are important and must be implemented by the utilities in order to comply with D.18-12-014. However, in Section 2.2.2, TURN will explain why compliance with the Settlement's Tranche requires is central to achieving the Commission's objective of balancing the achievement of safety and affordability goals. As the Commission stated in D.14-08-032, "[v]irtually everything a utility does [has] some nexus to safety and can be deemed to have some safety impact, *but the emphasis should be on those initiatives that deliver the optimal safety improvement in relation to the ratepayer dollars spent*."[6] Ensuring that the Sempra Utilities' safety initiatives are cost effective takes on even greater importance given the increasingly unaffordable levels of the Sempra Utilities' rates, as reflected in the Staff White Paper supporting the CPUC's February 2021 "Rates En Banc," which showed that SDG&E's average residential rate is much higher than that of PG&E and SCE[7] and, over the rest of this decade, projected to rise faster than the rates of those other two utilities.[8]

In summary, sufficiently granular tranches are necessary to achieve the goal of providing accurate information for GRC decision-making about the cost-effectiveness of proposed mitigations. When assets with different LoRE and CoRE values are grouped together, the resulting average RSE values will mask differences in individual asset RSEs. This matters

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[6] D.14-08-032 (Decision on PG&E's 2014 GRC), p. 28 (emphasis added).

[7] *Utility Costs and Affordability of the Grid of the Future, An Evaluation of Electric Costs, Rates, and Equity Issues Pursuant to P.U. Code Section 913.1* ("White Paper"), CPUC Staff, Feb. 2021, pp. 4-5, 70.

[8] White Paper, p. 8.

because a key objective of this quantitative analysis is to identify mitigations that will provide the greatest risk-reduction value for PG&E's customers, employees, and the public at large. Using average RSE values that do not account for individual asset differences prevents the Commission from having a record that allows it to make fine-tuned decisions about which mitigations to approve and in what scope, given affordability and other constraints.

The following section will provide a more detailed explanation of the serious problems that result from failure to implement the Settlement's Tranche requirements.

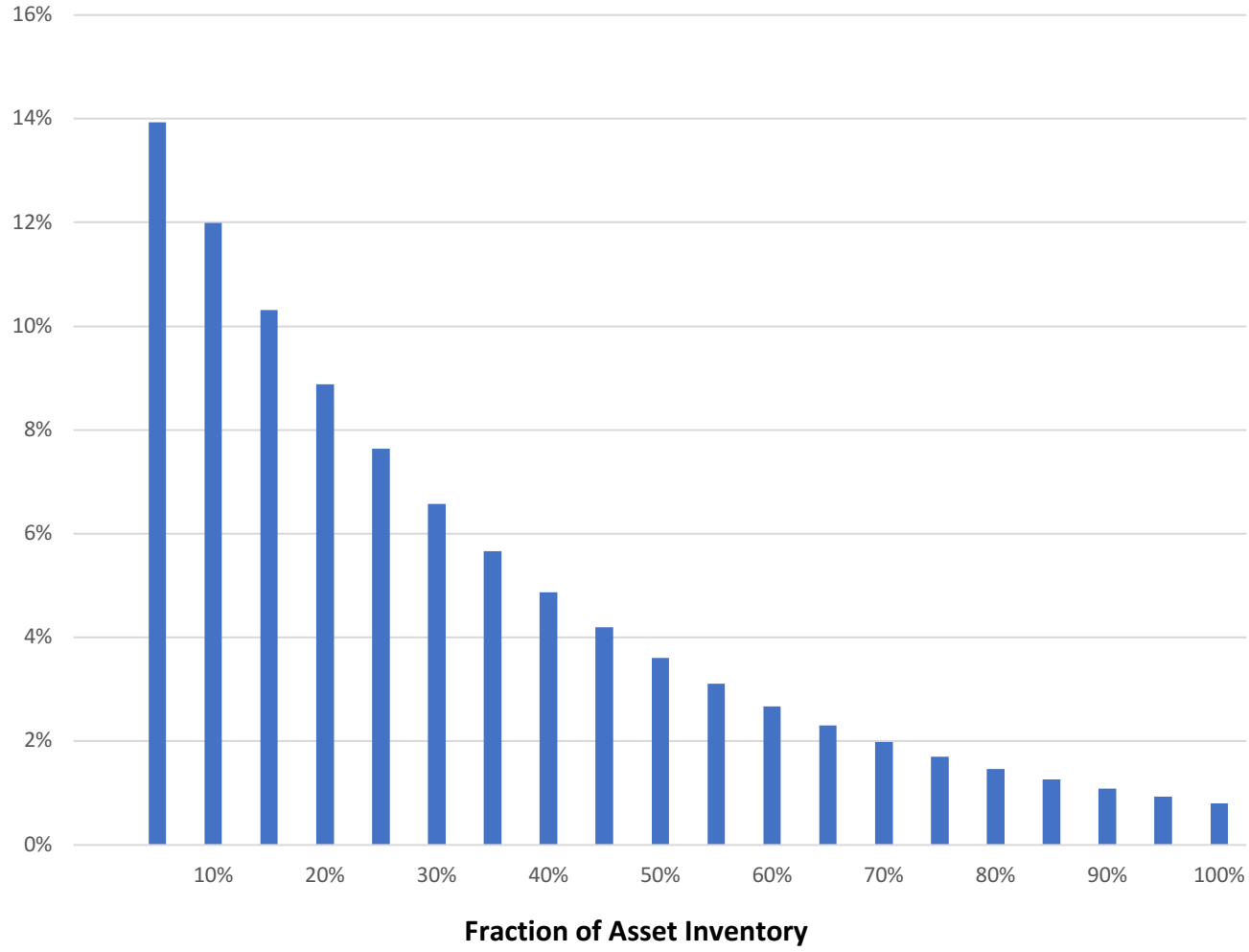
2.2.2. Analysis of Consequences of Non-Compliant Tranches

The consequences of failing to separate the assets into tranches are that (1) the amount of risk reduction provided by a mitigation are not computed as required by the Settlement; (2) RSE values for mitigations are not computed as required by the Settlement; (3) for most of the assets in the inventory, both the risk reduction and the RSE values are biased upwards; (4) the analysis is of little to no use in ensuring the scope of mitigations is based on targeting the activity to where it is most cost-effective; and (5) the most efficient program scope—how broadly to apply the mitigation to get the greatest risk reduction for the money spent recognizing the affordability constraint – cannot be discerned.

These conclusions are based on the following risk analysis, which will be explained in reference to the Sempra Utilities' High Pressure (HP) and Medium Pressure (MP) gas systems. However, this analysis is completely general and applies to any inventory of assets and, therefore, to all of Sempra's risks.

Consider the entire inventory of gas system assets, either high-pressure or medium-pressure. As required by the Settlement, break the inventory into approximately equal and relatively small segments (each segment comprising a small fraction of the total asset inventory) that have measurable and approximately equal risk characteristics (specified by LoRE and CoRE). For each segment, compute the risk (LoRE x CoRE). Divide the segment's risk by the fraction of the inventory in the segment to find the risk per unit of inventory over that segment. Order the inventory segments by decreasing risk per unit of inventory (where risk per unit of inventory = LoRE x CoRE divided by fraction of inventory in the segment). This creates a familiar bar chart with bars of decreasing heights, where the height of the bar is the risk per unit of inventory of the segment and the width of the bar is the fraction of the total inventory that is comprised by the segment. Therefore, the area of each bar is the risk of the segment. The important fact is that the sum of the areas of the bars is equal to the total risk over the inventory of assets. This is shown in Figure 1. Note that figure 1 presents bars of equal width. That need not be the case in any particular analysis—the fraction of the inventory in each segment can be variable.

Figure 1: Risk Distribution Of An Inventory of Assets



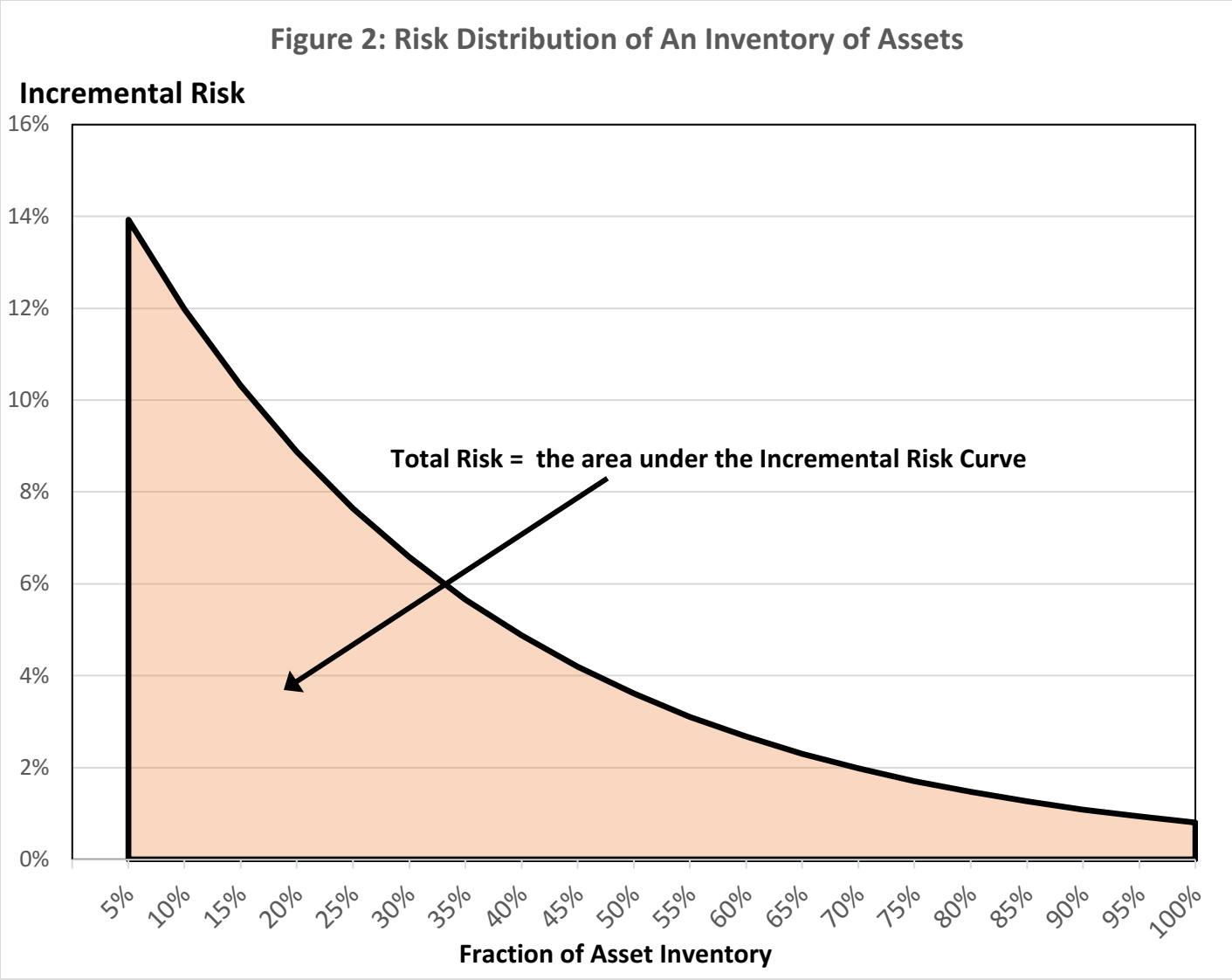
TURN does not have access to the actual Sempra data that describes the risk over the inventory of the gas systems, but we know that such data exists.[9] Nevertheless, we can make some general statements. For systems like this, the so-called "80-20 rule" (also known as the Pareto Principle) applies approximately. The principle states that, in this case, approximately 80% of the risk

[9] Response to TURN Data Request (DR) 11-1.a (database of results of DREAMS tool). Because of confidentiality issues, the Sempra Utilities provided TURN a redacted version of the Excel database of results.

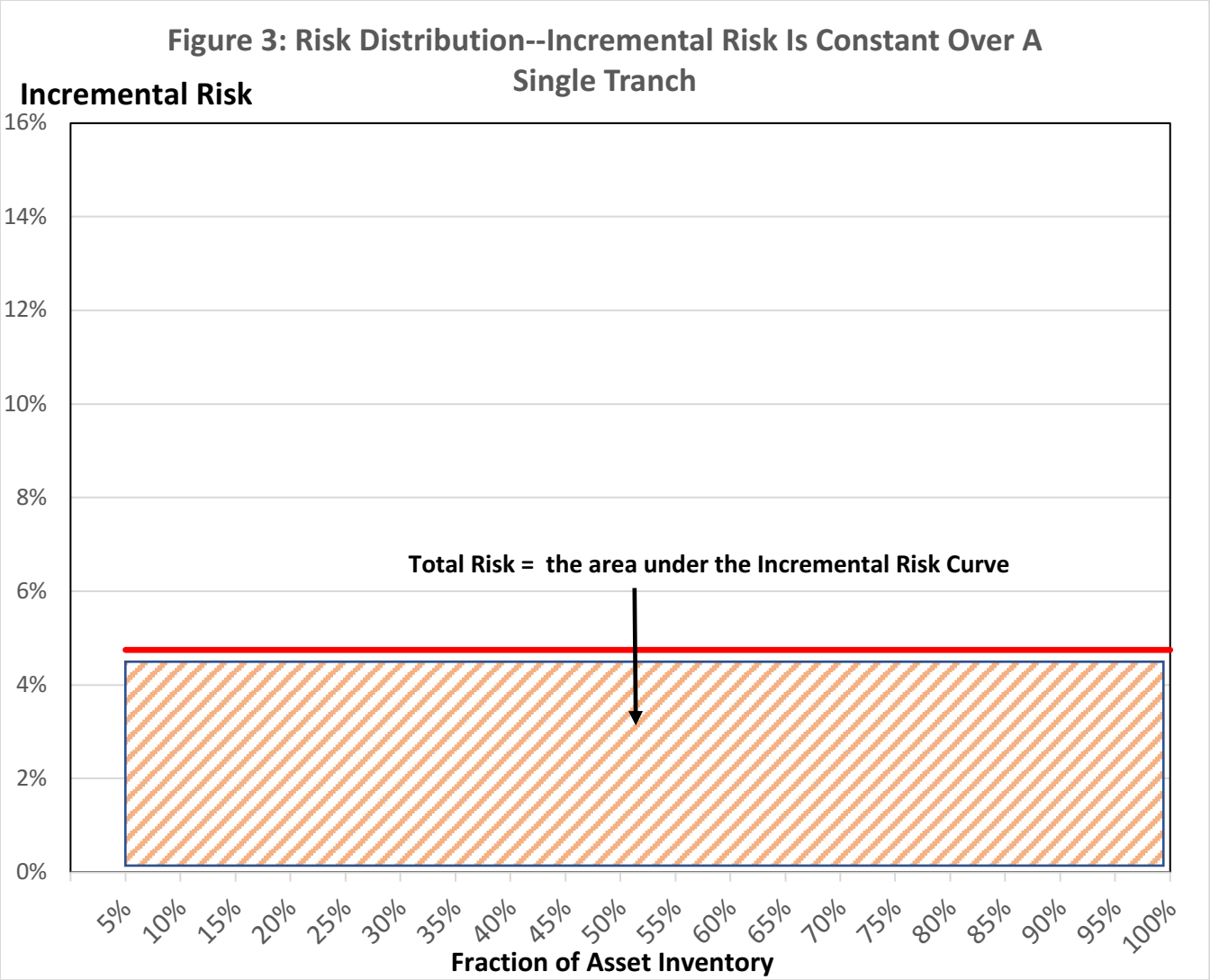
arises from approximately 20% of the inventory.[10] We have observed this behavior in other data for other risks, notably PG&E data for the wildfire risk.

With respect to Figure 1, this means that the heights of the bars sharply decrease as the cumulative inventory approaches 20% and then remain relatively low, while continuing to decrease, for the remaining 80% of the inventory. We can make the bar chart into a continuous function, as shown in Figure 2. The graph shows the relationship of incremental risk to fraction of inventory, so that, analogously to the sum of the areas of the bars, the total risk is the area under the curve, or the integral of the incremental risk function. This allows us to make the important point that in this graph, risk is equal to area. This is shown in Figure 2.

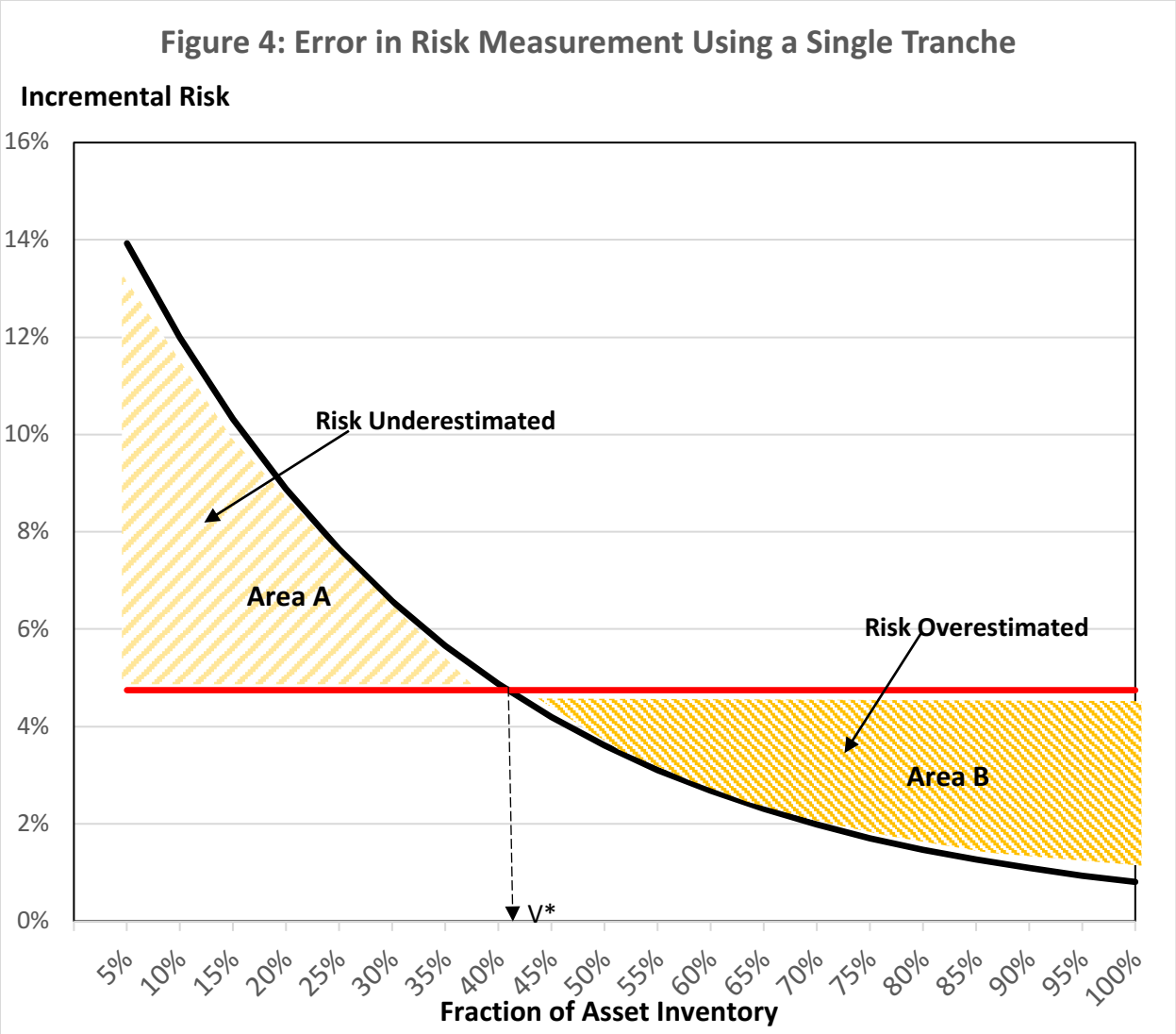
[10] As noted, this is a general principle that recognizes that a high proportion of the risk resides in a relatively small percentage of assets for a given risk. Depending on the risks and assets under study, the percentages can differ. TURN would expect that for certain assets and risks, 90% (or more) of total risk could be limited to 10% (or less) of assets.



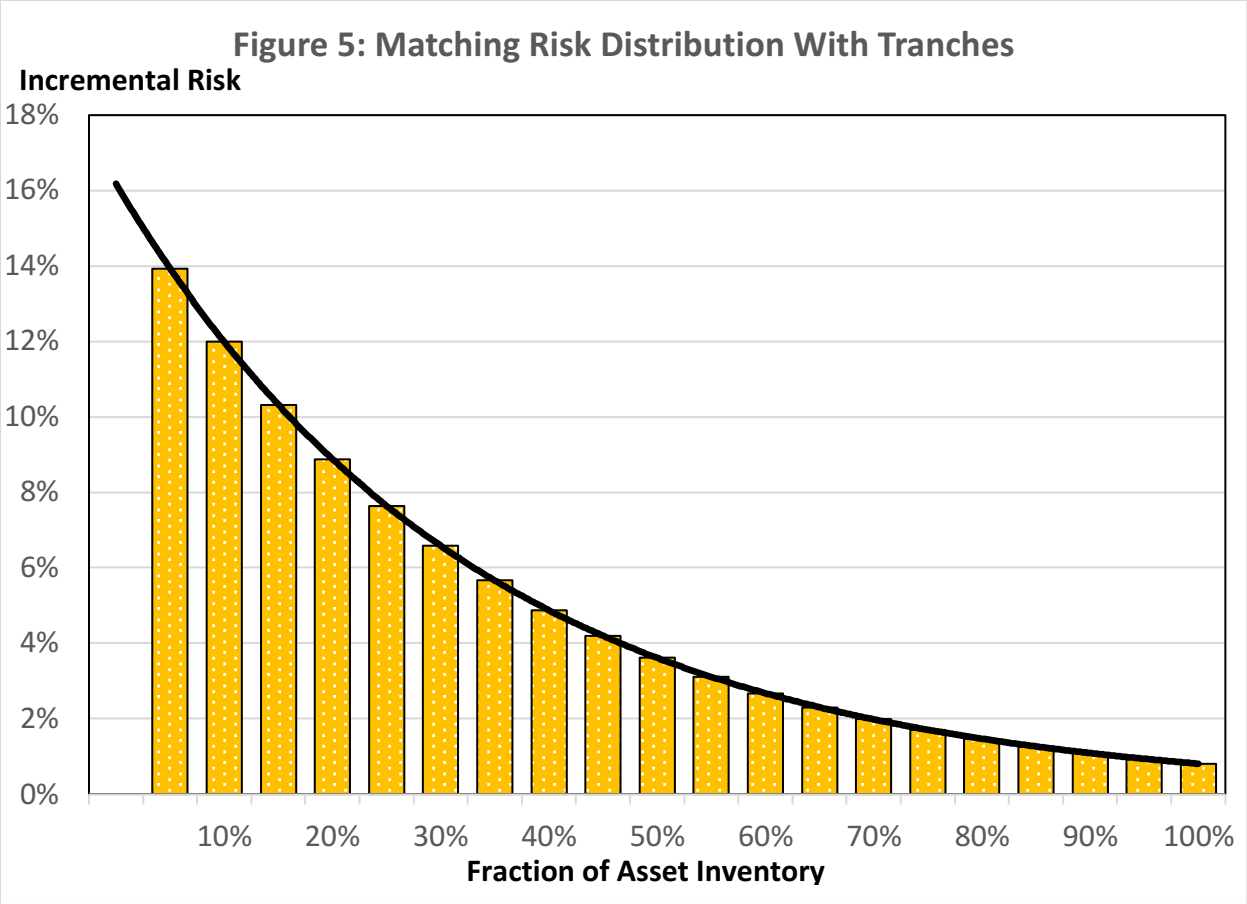
Now, consider what happens when the entire inventory is treated as a single tranche. This means that over the entire inventory, the incremental risk is constant, so the incremental risk function is horizontal, as shown in Figure 3 (see the red line). (It is worth noting that this is the defining property of a tranche: the incremental risk is constant over the entire tranche of assets.) Note that the area under the horizontal line, the area of the rectangle shaded in the figure, is the risk for the single tranche. The risk per unit of inventory for the single tranche is specified so that the area of the rectangle in Figure 3 is equal to the area under the curve in Figure 2.



Next, we combine Figures 2 and 3, as shown in figure 4. The areas under the curve and the rectangle must be the same (because the total risk is the same), so the height of the rectangle must be such that the area above the rectangle and below the curve (area A) must be equal to the area below the rectangle and above the curve (area B). That height is the incremental risk of the single tranche. The intersection of the rectangle and the curve identifies a critical fraction of the inventory, V*, as shown in Figure 4.



As shown in Figure 4, the risk of the assets in the relatively high risk fraction of the system that is less than or equal to V* is underestimated and the risk of the assets in the relatively low risk fraction of the system that is greater than V* is overestimated. As suggested in Figure 4, which shows only one tranche used to approximate the actual risk distribution over the entire inventory, the risk will be more accurately estimated if multiple tranches are constructed, as required by the Settlement, which would create a bar chart (such as in Figure 1) that more closely approximates the curve (shown in Figure 2), such that each bar is a tranche. This is illustrated in Figure 5. The figure shows bars of equal widths. In any particular analysis, that need not be the case. The tranches can contain any amounts of the asset inventory.



This analysis also implies that the risk reductions and the RSEs that Sempra calculates are similarly computed incorrectly. This follows because Sempra computes risk reduction for virtually all mitigations by reducing the pre-mitigation risk, LoRE x CoRE, by a fraction, say *f*, such that the risk reduction is equal to (1 - *f*) x LoRE x CoRE. Therefore, the risk reduction over the entire inventory is simply a scaled version of Figure 2 or Figure 3, where the height of the graph is reduced by the fraction (1 - *f*). The height of such a graph can be interpreted as risk reduction per unit of inventory. Further, if we make the simplifying assumption that the cost of a mitigation is some amount *C* per unit of inventory, then the RSE per unit of inventory is equal to (1 - *f*) x LoRE x CoRE/C, which is yet another scaled version of Figures 2 or 3. Therefore, Figures 4 and 5 apply to both risk reduction and RSE.

It is also reasonable to observe that the importance of tranching to achieving accurate RSEs depends on the steepness of the decrease in risk per unit of inventory that is shown in Figures 1 or 2. If the decrease in incremental risk is rapid, that is, if a small percentage of assets provide a large percentage of the total risk reduction, then a more extreme version of either Figure 1 or Figure 2 suggests that relatively few inventory segments need to be mitigated. In this case, tranching becomes even more important because treating all assets together in a single tranche will result in (i) overestimation of total risk reduction for most of the inventory (area B in

figure 4) and (ii) an incorrect RSE that supports excessive spending on applying a mitigation that provides little risk reduction over a large fraction of the inventory of assets.

2.3. SDG&E's Wildfire Risk Chapter Fails to Meet the Settlement's Tranche Requirements

2.3.1. Summary

SDG&E's wildfire risk analysis in its RAMP filing calculates RSEs for just three tranches – Tier 2 High Fire Threat District (HFTD Tier 2 or "Tier 2"), HFTD Tier 3 (or "Tier 3"), and in some cases non-HFTD.[11] However, SDG&E has a much more granular wildfire risk model, called Wildfire Next Generation System (WiNGS), which the utility uses to "help prioritize [its] grid hardening mitigations."[12] As explained in Section 2.1 above, because SDG&E uses the WiNGS model for managing the assets affected by the wildfire risk, the output of that model should have been used to determine the tranches of assets with homogenous risk required by Row 14 of the Settlement.

None of the WiNGS model's results are presented in the utility's RAMP filing or workpapers, but were provided to TURN in data requests for circuit segments with scoped grid hardening mitigations.[13] For the reasons stated herein, TURN recommends SDG&E's GRC filing include tranches with RSEs calculated at the more granular level presented in the utility's WINGS model. Further, the model should be utilized to derive risk reduction and RSE's for additional wildfire mitigations beyond covered conductor and undergrounding, including but not limited to vegetation management programs.

2.3.2. Analysis

The granularity of tranches presented by SDG&E in its RAMP for most wildfire mitigations --Tier 3 and Tier 2 HFTD -- is far too aggregated to meet applicable Settlement requirements. Indeed, WINGS model results illustrate that wildfire risk per mile based on this more granular analysis is highly heterogenous (see Figure 6 below), with a large amount of risk concentrated among relatively few miles. This result may be even more pronounced if it could be calculated for SDG&E's entire HFTD; however, SDG&E would not provide these model results to TURN.[14]

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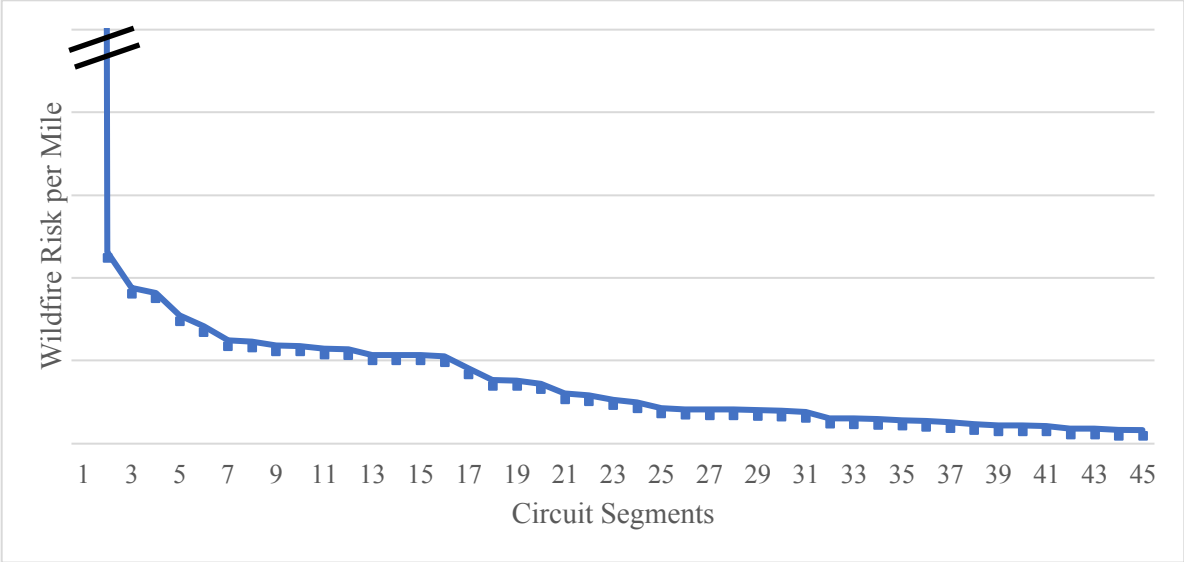
[11] SDG&E RAMP, pp. 1-5 to 1-6.

[12] SDG&E RAMP, p. 1-18.

[13] TURN-6, Question 1, Excel attachment. SDG&E would not provide the entire WINGS model for its HFTD. See response to TURN DR 9, question 1.

[14] TURN-9, Question 1.

Figure 6. Wildfire Risk per Mile – SDG&E "WINGS" Model Results[15]



The high degree of heterogeneity in wildfire risk illustrated in Figure 6 is completely lost when aggregating by HFTD tier. SDG&E's Tier 2 and 3 HFTD are comprised of around 1,800 and 1,600 overhead circuit miles, respectively,[16] compared to the WINGS model which calculates risk for circuit segments from one-tenth of a mile to around 30 miles in length.[17] WINGS model results also indicate that some Tier 2 circuit segments are actually *higher* risk than circuit miles located in Tier 3—a facet of wildfire risk that could not be ascertained with the results presented in SDG&E's RAMP filing. Indeed, the *highest* risk per mile circuit segment is located in Tier 2, according to the WINGS model results provided to TURN.[18] This illustrates again why highly granular tranches are critical to gaining an accurate understanding of the relative risk and RSE of mitigation proposals, which can then be utilized by the Commission and stakeholders to properly scope and prioritize utility risk mitigation programs.

[15] Calculated from TURN-6, Question 1, Excel attachment. The x-axis indicates the cumulative number of circuit segments for which SDG&E provided WiNGS results, from highest risk (per mile) segment to lowest risk segment. The y-axis is curtailed at a lower maximum value than calculated for the highest risk circuit, indicated by the black bars, in order to view the much lower risk values of lower-ranked circuit segments.

[16] SDG&E WMP Revised 2021 Filing, Excel Tables Attachment B, Table 8.

[17] TURN-6, Question 1, Excel attachment.

[18] Calculated from TURN-6, Question 1, Excel attachment, and sorted for wildfire risk per mile.

In addition, SDG&E has not utilized its WINGS model for any wildfire mitigations other than covered conductor and undergrounding.[19] SDG&E thus plans to request funds from ratepayers for tens of millions of dollars over the next GRC period for programs with non-granular RSEs that do not meet the requirements of the Settlement.[20] These include tree trimming (around $32-$38 million in TY 2024) and enhanced vegetation management ($10-12 million in TY 2024).[21] SDG&E seems to acknowledge the importance of calculating more granular RSEs for these programs, stating it "plans to explore the use of WiNGS to evaluate vegetation management prioritization in the near future."[22] SPD should recommend that the utility utilize the same tranches derived from WINGS to calculate RSEs for the vegetation management programs in the utility's upcoming GRC, rather than aggregating risk reduction and cost of its proposals by HFTD tier. Failure to do this would constitute a breach of the settlement agreement adopted by the Commission.

Finally, SPD and the Commission should not accept an excuse that the utility does not track costs at the tranche level. The Sempra Utilities have been on notice since they signed the Settlement in April 2018 and it was approved in December 2018 that they would be required to calculate RSEs, which require cost estimates for the denominator, at the tranche level. They should have implemented systems to at least provide credible estimates of costs of mitigations by tranche. SPD should make clear that absence of cost tracking systems should not be allowed to serve as a justification for failing to comply with the Settlement and that the Sempra Utilities should accelerate their efforts to enable reliable estimation of tranche-level costs.

2.4. The Sempra Utilities' Gas Risk Chapters Fail to Meet the Settlement's Granularity Requirements

The two Sempra Utilities each identified two RAMP risks that are related to the operations of the gas system – those related to the high-pressure (HP) system (Chapters SCG-1

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[19] Response to TURN-4, Question 1. TURN notes that this response misstates the Settlement's tranche requirements. As discussed in Section 2.1, Row 14 requires that the assets associated with a risk event be subdivided into tranches <u>for each risk event</u>. Thus, contrary to SDG&E's response, the utility may not pick and choose, based on mitigation, when to use the Settlement's required tranches for the analysis. To ensure consistency in the risk analysis, to enable comparison of the relative benefits of different mitigations at the tranche level, and to avoid errors such as Sempra made with the Gas HP risk (see Section 2.4.2.1 below), the same tranches must be used for each risk event, even if, for a particular mitigation, the results of the mitigation are uniform for many of the tranches.

[20] SDG&E RAMP, Table 10, pp. 1-97 to 1-109.

[21] SDG&E RAMP, Table 10, p. 1-100.

[22] SDG&E RAMP, p. 1-65.

and SDG&E-3) and those related to the medium-pressure (MP) system (Chapters SCG-3 and SDG&E-9). Contrary to the Settlement, the RSE analysis for mitigations for each of these risks fails to consider the separate tranches of assets that comprise the asset inventories of the HP and MP gas system. Instead, for the RSE analysis, Sempra treats each risk as if all the assets that are exposed to it comprise a single tranche. Even though the Sempra Utilities may seem to make a nod in the direction of tranching in differentiating between high and low consequence events in building their pre-mitigation risk scores for these risks, they do not properly use such distinctions to create separate tranches for their RSE calculations. In fact, as discussed below, in the case of the HP risk, the failure to create correct tranches appears to lead to a significant error that overstates the RSEs for the HP mitigations.

In any event, the variations in risk among the highly heterogenous assets for both the HP and MP risks require tranches that are far more granular than merely dividing assets into high consequence and low consequence areas. The result is all of the adverse consequences that are described in Section 2.2.2 above.

2.4.1. Medium Pressure Pipeline System[23]

SCG's medium pressure pipelines comprise approximately 100,000 miles of mains and services, with over 22,000 miles of steel mains and approximately 25,000 miles of plastic mains.[24] Although SCG builds its pre-mitigation risk score from separate consideration of high consequence and low consequence "events" (as opposed to assets in high consequence and low consequence areas), its RSE analysis is based on a single tranche with one aggregated value for LoRE = 544.99, CoRE = 5.63 and a Pre-Mitigated Risk Score = 3,071.[25]

SCG's most expensive MP risk mitigation programs are C21-T1, the Vintage Integrity Plastic Plan (VIPP) and C21-T2, the Bare Steel Replacement Program (BSRP). The VIPP addresses plastic pipe that is known to "exhibit a brittle-like cracking characteristic that could cause a leak to grow" (p. SCG-3-24). The BSRP "focus(es) on the replacement of bare steel with the highest leak rates." (p. SCG-3-25). For RSE calculation purposes, SCG shows the total cost of VIPP as $657,339,000[26] for 327 miles of pipe replacement[27] and the total cost of BSRP as

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[23] The analysis in this section focuses on SoCalGas (SCG), but applies equally to SDG&E's report, which uses the same methodology.

[24] SCG RAMP, p. 3-3.

[25] File labeled "Final 2021 RSE Workpaper – SCG MP – Supplemental_Level 2", "Risk Scoring Workpaper" tab.

[26] *Id.,* cell E17.

[27] SCG RAMP, p. 3-38, Table 5.

$281,718,000[28] to replace 139 miles of pipe.[29] SCG's RAMP report does not explain how it determined the specific proposed replacement mileage for these programs, only stating that it plans to increase the level of replacement over current levels.[30]

SoCalGas also notes that both these programs benefit from "the DREAMS tool [that] is used to prioritize risk mitigation on early vintage plastic and steel pipeline segments." (p. SCG-3-24). SCG further explains that this "algorithm includes pipe attributes, operational conditions and potential impact on population" and that the results of the DREAMS analysis "determine appropriate action to address risk for each segment and prioritize replacement investments based on a failure analysis." (p. SCG 3-24). TURN obtained through discovery a redacted version of the respective DREAMS databases for plastic and steel pipe. To illustrate the granularity of information that SCG maintains, the plastic database has 41 columns of detailed information for each of over 171,000 plastic pipe segments, all but one of which are less than 1 mile in length, many less than 0.10 mile long.[31]

As noted in Section 2.1, Row 14 of the Settlement requires tranches to be determined based on how the assets are managed by the utility, data availability and model maturity. SCG's RAMP report admits that it uses the DREAMS algorithm to make decisions about how to manage risks for its pipe segments, and clearly the necessary data is available to fashion granular tranches that group SCG's plastic and steel pipe based on homogenous risk profiles as required by the Settlement. At the September 14, 2021 workshop, SCG's representative acknowledged that the company could use the DREAMS information to break down their RSE analysis into tranches, but that they have not done so. By not determining granular tranches based on the operational information available to SCG via the DREAMS database, SCG is in plain violation of the tranche requirements of the Settlement.[32]

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[28] File labeled "Final 2021 RSE Workpaper – SCG MP – Supplemental_Level 2", "Risk Scoring Workpaper" tab, cell E16.

[29] SCG RAMP, p. 3-39, Table 5.

[30] SCG RAMP, p. 3-24.

[31] Response to TURN DR 11-1.a, Redacted Excel File "Plastic Risk Results_DR_Redacted", not available on SCG's website.

[32] Although tranching limited to plastic vs. steel pipe would be clearly inadequate to achieve tranches with homogenous LoRE and CoRE values, SCG does not even do that. This can be seen from the fact that SCG uses the same pre-mitigated LoRE value of 544.99 for both the VIPP and BSRP programs (indeed for all MP mitigations). (Final 2021 RSE Workpaper -SCG MP-Supplemental_Level 2, RSE Summary tab, cells G16, G17). If SCG had separate tranches for steel and plastic pipe, it would have calculated separate pre-mitigation LoREs for the two

The adverse consequences of SCG's use of a single tranche for the MP risk are exactly as described in section 2.2 above. The single aggregated RSEs for each of VIPP (1.16) and BSRP (0.88) both underestimate RSE for the relatively high-risk tranches that should be reflected in SCG's analysis and overestimate RSE for the relatively low-risk tranches, following the pattern shown in Figure 4 above. By failing to use the requisite tranches for its RSE calculations, Sempra, the Commission, and the parties are deprived of information to assess the tranche-by-tranche cost-effectiveness of MP mitigations such as VIPP and BSRP and make informed judgments about how to balance considerations of risk reduction and affordability.

In this regard, Sempra cannot accurately claim that the Commission has directed it to replace as much vintage plastic and steel pipe as its resources would allow and not consider cost-effectiveness and affordability.[33] In fact, while D.19-09-051 notes that SCG's current replacement rate of vintage plastic and steel pipe in not on pace with its original assessment, it also states that safety mitigation programs such as these "must . . . be prioritized and balanced with keeping rates affordable." (D.19-09-051, p. 192).

The required remedy to bring Sempra's RSE analysis for the MP risk is clear. Sempra has detailed information about its MP assets in the DREAMS database that it uses to prioritize its work. That information should be used, with other information that may be available to Sempra, to create the tranches that are required by the Settlement. Each tranche must contain assets that have the same likelihood of occurrence of the risk event (LoRE) and the same consequences if the risk event occurs (CoRE). While this is a requirement of the Settlement as discussed in section 2.1, it is also a matter of sound policy, as discussed in section 2.2. Using these tranches, Sempra must then calculate tranche-level RSEs, as required by Row 14 of the Settlement.

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types of pipe, which presumably would sum to the 544.99 aggregated LoRE for all of the assets combined. Note also that the CoRE for VIPP and BSRP – and indeed every MP mitigation is the same as the total system CoRE, 5.63 (Final 2021 RSE Workpaper -SCG MP-Supplemental_Level 2, RSE Summary tab, column P). Therefore, SoCalGas evaluated every mitigation as if all the assets subject to the mitigation were in a single tranche.

TURN points this out to show that, contrary to Sempra's misleading claims, SCG's calculation of separate RSEs for VIPP and BSRP should not be confused with separate tranches for plastic and steel pipe. Moreover, as discussed in connection with the HP risk in section 2.4.2.1, doing separate RSE calculations for subsets of assets without having separate pre-mitigation risk calculations for those separate assets is an incorrect methodology that leads to incorrect RSEs.

[33] See, e.g., response to TURN DR 11-1(c), incorrectly suggesting that the TY 2019 GRC decision, D.19-09-051, *requires* Sempra to accelerate the replacement of vintage plastic and steel pipe.

2.4.2. High Pressure Pipe System[34]

2.4.2.1. Apparent Tranche-Related Error in RSE Calculations

The SCG RAMP states that the company operates approximately 1,100 miles of high-pressure transmission lines in high-consequence areas (HCAs) out of a total of 3,341 miles of such pipe,[35] as well as approximately 3,300 miles of HP distribution pipe.

As with its MP pipeline system, SCG aggregates all of the different types of equipment in its HP system – pipelines, compressor stations, measurement and control stations, etc. - in these different areas into a single tranche for purposes of RSE calculations, contrary to Row 14 of the RAMP Settlement. Although the SCG Report indicates that most HP mitigations are divided into HCA and non-HCA "tiers", SCG uses aggregated pre-mitigation risk scores that do not distinguish between HCA and non-HCA assets in its RSE calculations.[36] Instead, for purposes of the RSE calculations, SCG calculates a single weighted average CoRE value of 537.6 for all HP risk events and aggregates the LoRE values of transmission and supply line events (including events at compressor stations), for a total of 8.64 events per year.[37] From this, SCG calculates a single pre-mitigation risk score of 4,644 (8.64 x 537.6). These are the values that SCG uses for all of its RSE calculations, instead of values for LoRE, CoRE and Risk Score that are differentiated by HCA vs. non-HCA, even though the entire concept of HCAs and non-HCAs means that events in these areas have different consequences.

The failure to conduct the pre- and post-mitigation risk analysis separately in HCA and non-HCA areas appears to cause a fundamental error in Sempra's calculations. The error renders all of the RSE values shown for the HP system incorrect and inflated because, together, SCG's analysis assumes distinct programs in HCAs and non-HCAs reduce more than 100% of risk. That is impossible. TURN's analysis finds that, based on the information SCG has provided, recalculated RSEs equating high and low consequence events with HCA assets and non-HCA assets (which may not be what SCG intended), would reduce all of the HCA RSEs by 69% and the non-HCA RSEs by 31%.

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[34] As was the case with Section 2.4.1, the analysis in this section focuses on SoCalGas, but applies equally to SDG&E's report, which uses the same methodology.

[35] SCG RAMP, p. 1-3.

[36] This violates Row 16 of the Settlement, which requires that the effects of a mitigation be "expressed as a change to the *Tranche-specific* pre-mitigation values for LoRE and CoRE." (Emphasis added).

[37] Excel file: "Final 2020 RSE Workpaper – SCG HP – Supplemental_Level 2", "RSE Summary" tab.

To understand this error, recall that the reported LoRE for the entire HP system is 8.64. SCG assumes that none of its mitigations reduce CoRE. Rather, the programs solely reduce LoRE values. Suppose a mitigation program reduces LoRE from the pre-mitigation value of 8.64 events/year to zero. Doing so would eliminate all risk because the mitigation program would have eliminated all risk events. Clearly, the number of post-mitigation risk events cannot be less than zero. Thus, if we consider the entirely separate mitigations designed for HCAs and non-HCAs -- because these areas are geographically distinct, there is no program overlap – then collectively they cannot reduce LoRE by more than 8.64. For example, if a non-HCA program reduces the pre-mitigation LoRE from 8.64 events/year to 2.0 events/year, the most an HCA mitigation program can reduce LoRE is by the remaining two events. Note that, in column B of the "RSE Summary" worksheet, the IDs for programs in HCAs are designated at the end as "TO1" and programs in non-HCAs are designated "TO2".

With this in mind, consider column F of the "RSE Summary" worksheet, which shows the "% Change in LoRE" values for each control/mitigation and column M, which shows the "Post-Mitigated LoRE" values for each control/mitigation. Next, we examine the "Integrity Assessments & Remediation" programs, which are two of the largest programs by expenditure. The SCG workpaper identifies a total cost of $246.9 million for the program in HCAs (C21-T01) and $427.7 million for the program in non-HCAs (C21-T02), or about $675 million in total. Because the programs are in different areas, there is no geographic overlap. Hence, both programs can be done independently.

As shown in cell F22, SCG reports a 71% reduction in LoRE for the HCA Integrity Assessment/Remediation Program. As shown in cell F23, SCG reports a 92% reduction in LoRE for the non-HCA program. Hence, as shown in cells M22 and M23, the resulting post-mitigation LoRE values are 2.51 for the HCA program and 0.67 for the non-HCA program. Thus, SCG assumes implementing the program in the HCAs reduces LoRE by 6.13 events/year (8.64 – 2.61) and implementing the program in the non-HCAs reduces LoRE by 7.97 events/year (8.64 – 0.67). Hence, the total reduction in LoRE in HCAs and non-HCAs combined is 14.1 events/year (6.13 + 7.97). Because the total pre-mitigated LoRE is 8.64 events/year, it is clearly impossible for these non-overlapping programs to reduce LoRE by 14.1 events/year.

This is the most egregious of the fundamental errors made by SCG arising from its aggregated calculations. SCG's HP workpapers show that this error extends throughout the various mitigations that are separated into HCAs and non-HCAs. The impact of this error is to significantly inflate the RSE values that SCG calculates.[38]

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[38] TURN discovered this apparent error as it was preparing these informal comments and well after the conclusion of the workshops. TURN believes its analysis is supported by a fair reading of Sempra's workpapers. If, as has happened before in this case, the seemingly

2.4.2.2. Inadequate Tranches

Even if the error described above is fixed and the RSE analysis is disaggregated between assets in HCA and non-HCA areas, tranches that merely distinguish between HCA and non-HCA assets would be plainly inadequate to meet the Settlement's tranche requirements.

With respect to the biggest category of HP system assets – pipelines -- SCG acknowledges that the risk of failure depends on a variety of factors, including stress on the pipe, the pipe material properties, and the geometry of the latent weak point on a pipeline,[39] which would include seam and weld type. Similarly, assets in the HP system that are distinct from pipeline, such as compressor stations and measure and control stations – and their constituent components – have different risk profiles from pipe and, likely, from each other, and thus need to be grouped into separate tranches. Like all gas utilities, the Sempra Utilities have a detailed operational database to meet federal and state regulatory requirement that would allow them to group their pipeline assets into tranches with homogenous risk profiles, as required by the Settlement. By failing to comply with the Settlement's tranche requirements, the aggregated (and seemingly incorrect, as explained above) RSEs presented by Sempra suffer from all of the problems discussed in Section 2.2.2 above. For all mitigations, including costly mitigations such as hydrotesting and pipeline replacement, the result is that the Commission and parties lack accurate RSE information to assess whether Sempra's proposed mitigation programs are cost-effective in scope.

The remedy to correct this failure to comply with the Settlement is the same as for the MP risk. Sempra must use its Integrity Management and other operational databases to divide its HP assets into tranches with homogenous risk profiles. Sempra must then calculate RSEs for each of those tranches, as required by Row 14.

2.4.3. Failure to Explain Rationale for Determination of Tranches

As noted in section 2.1, the Settlement requires the utility to provide the rationale for its determination of tranches, including its judgment that no tranches are appropriate for a risk event. With respect to both the MP and HP risks, Sempra's RAMP reports provide no such discussion, which is a blatant violation of the Settlement. TURN encourages SPD to include in its evaluation report an assessment of whether the Sempra Utilities have complied with this clear requirement with respect to each risk presented in their RAMP reports.

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incorrect outcomes reflect errors in the way Sempra has presented its workpapers, then this will be another example of the enormous difficulties posed by Sempra's inadequate, tardy, and poorly presented and explained workpapers, as discussed further in Section 5 below.

[39] SCG RAMP, p. 1-4.

3. Problems with the Calculation of RSEs

3.1. The Use of the So-Called "% % %" Method for Calculating Risk Reduction for Gas Risks Is Highly Problematic

For the gas risks, Sempra describes a method for specifying the risk reduction provided by a mitigation that is based on the expression:

$$Risk\ Reduction = \%\ risk\ addressed * \%\ mitigation\ scope * \%\ effectiveness * Pre-Mitigated\ Risk\ Score$$[40]

The Sempra Utilities often referred to this as the % % % method.

The three factors are defined as follows:

- % risk addressed is the fraction of the "overall risk that will be addressed by a given activity" by "evaluating the drivers/triggers that the specific mitigation addresses as a percentage of the risk event."
- % mitigation scope "is calculated as the percentage of units that will be addressed over the duration of the activity, relative to the number of units in the system prior to the start of the activity."
- % effectiveness "is a factor that represents how well the execution of the scope reduces the portion of the overall risk addressed by that activity."[41]

This method is problematic for several reasons.

The biggest problem is the opaque nature of the "% Effectiveness" value. We do not know how Sempra computes or specifies this factor, contrary to Row 29 of the Settlement, which requires the source of inputs to be clearly specified and, when that source is subject matter expert judgment, the process . However % effectiveness is being determined, the values that Sempra uses are highly questionable, most egregiously those that counterintuitively exceed 100%.

In its response to TURN data request 8-3, Sempra states that "in the case of full asset replacement, the new asset theoretically should alleviate all existing risk beyond the operation of the asset; therefore, the effectiveness will be close to, if not, 100%." Yet, as column J of the worksheet "RSE workpaper" in the HP gas spreadsheet workpaper "Final 2021 RSE Workpaper

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[40] Response to TURN DR 8-1.

[41] *Id.*

= SCG HP Supplemental Level 2.xls" shows, there are numerous mitigations with "% effectiveness" values that are greater than 100%, with the two highest values for the two largest-dollar programs for Integrity Assessment and Remediation in HCAs (387.60%) and non-HCA's (248.06%). For the MP risk, "% effectiveness" values are as high as 724% for Cathodic Protection – 100mV Requalification. For the two largest programs, the BSRP and VIPP programs, the "% effectiveness" values are 387.0% and 305.0%, respectively.

In its response to TURN data request 8-3, Sempra explains that "% effectiveness" values greater than 100% arise because "SDG&E and SoCalGas recognize that not all assets in operation face the same set of risks or are affected as such." Sempra continues, "When considering that the risk score is developed *at the system level* containing all asset types, and that the risk addressed percentage is also derived *from a system perspective*, an activity that is known to address *a more vulnerable part of or asset within the system* could potentially have a greater effect in reducing risk, since a more vulnerable asset would yield a greater number of incidents compared to a less vulnerable asset." (Emphasis added.)

This response strongly suggests that Sempra's questionable % effectiveness values result from its incorrect view that the pre- and post-mitigation risk scores used to calculate RSEs are supposed to be calculated at the aggregate "system level." As shown in section 2.1 above, this view is decidedly wrong because the Settlement requires risk scores and RSEs to be calculated at the tranche level, with each tranche consisting of a sub-group of assets having a homogenous risk profile. Sempra seems to view the % effectiveness value as a way to recognize that there will be tranches of assets that have above average risk scores and that mitigating such assets will have an above-average impact on reducing risk. However, the way that the Settlement requires this dynamic to be taken into account is to perform the RSE analysis at the tranche level, not to engage in guesswork that yields dubious % effectiveness values above 100%.

Logically, "% effectiveness" must be related either to a change in LoRE or a change in CoRE. In its HP and MP workpapers, Sempra indicates that the sole source of risk reductions are reduction in LoRE values. Hence, "% effectiveness" can be related only to reductions in LoRE. Sempra's response to TURN data request 8-3 claims that values greater than 100% are the result of targeting specific assets within a broader class of assets. However, in the case of MP pipe, the class of assets is a single tranche: all MP pipe. Thus, to develop its "% effectiveness" values, Sempra is, on the one hand, acknowledging different tranches of assets, with some tranches having greater LoRE values than others, while at the same time calculating RSE values that are applied to all pipe. Such an approach is not only logically inconsistent, it is a clear violation of the tranche requirements of the Settlement.

In addition, Sempra's technical explanation of the "% effectiveness" values for leaking pipe is inconsistent with the statement about more vulnerable assets quoted above. In the August 3, 2021 workshop, Sempra claimed that the 305% "% Effectiveness" value for its MP VIPP

replacement mitigation (RISK-3-C21-T1) stems from the fact that replacement pipe will have a leak rate that is 1/3 of existing pipe. This means that, if plastic pipe was replaced with pipe having the same leak rate, then the "% effectiveness" value would be 100%. As such, under the methodology, there would still be a risk reduction. But intuitively, replacing leaking pipes with pipe that has the same leak rate would not reduce risk at all. Yet, under Sempra's methodology, replacing existing pipe with new pipe having the same leak rate would reduce LoRE. Again, this points to serious methodological problems with the "% effectiveness" values.

Furthermore, as noted, contrary to Row 29 of the Settlement, there is no information provided as to how Sempra uses expert judgment to determine this factor. While the Settlement allows the use of expert judgment, that expert judgment must have some underlying basis that can be evaluated independently. The specificity of many "% Effectiveness" values leads TURN to believe there is some underlying, but unexplained, methodology for determining these values. For example, the MP controls RISK-3-CO1 and CO2, which address Cathodic Protection Base and CP10 activities, respectively, have "% Effectiveness" values of 343.90%, as shown in cells J13 and J14 of the worksheet "RSE Workpaper" in the Spreadsheet "Final 2021 RSE Workpaper – SCG MP Supplemental Level 2.xls." It strikes TURN as highly unlikely that an SME would select such a precise value without some underlying calculational basis. However, Sempra has never provided any such details, again contrary to the transparency requirements of the Settlement.

There are also problems with the "% Risk Addressed" values. For the HP and MP mitigations, those values sum to more than 100 percent. While TURN recognizes that the "% Risk Addressed" values arise from the bow tie and reflect the extent to which a given mitigation addresses drivers, the only way programs can address more than 100% of the total risk is for there to be program overlap. But, if programs overlap, then Sempra must account for the incremental risk reductions that programs achieve when calculating RSE values, rather than calculating risk reductions as if no other programs are implemented. Otherwise, if Sempra proposes to implement multiple, overlappying programs, the RSE values for those programs will suffer from upward bias.

To calculate risk reduction and RSEs in accordance with the Settlement, Sempra need to use a different methodology. A compliant methodology needs to begin by determining the tranches with homogenous risk profiles, as required by the Settlement. Once those tranches are determined, it should be much more straightforward to estimate the impact of a given mitigation on the tranche-specific LoRE values. For example, one would expect that replacement of faulty pipe with new pipe would reduce a significant percentage of the risk associated with that pipe. Thus, determining the risk reduction for a tranche with high risk pipe would be simply a matter of reducing the pre-mitigation LoRE for that tranche by the calculated percentage, which then easily allows the calculation of risk reduction for that tranche. To comply with Row 29 of the Settlement, Sempra must provide the source for any estimate of the percentage that a mitigation

would reduce the LoRE, and if the source was SME judgment, an explanation of the basis for the judgment.

3.2. Failure to Properly Discount the Values in the RSE Calculation

In addition to other problems discussed in these comments that lead to inflated RSE values, all of the RSE values calculated in the SDG&E and SCG RAMP reports are biased upwards because Sempra does not discount costs and benefits in the manner specified by the Settlement.

Row 25 of the RAMP Settlement requires that RSE values be calculated using present values for both risk reductions (the numerator) and costs (the denominator). Although the Settlement does not specify a discount rate value that must be used for all RSE calculations, the discount rate chosen should be consistent with basic economic and financial principles that reflect the time value of money.

In its RAMP reports on page C-31, the Sempra Utilities state that they use 3% to discount the risk reduction, the numerator of the RSE. Sempra cites a report[42] as justification for the 3% rate. (Although the link to footnote 43 where this report is cited did not work, TURN located and reviewed the report.) The discount rate used in the report is a 3% real discount rate, i.e., one that removes the effects of inflation and thus reflects the pure time value of money. This value is sometimes called the "social rate of time preference" and is sometimes used for analyses of public policies enacted by governments."[43]

In contrast, Sempra is a private firm, which uses monies provided by investors and ratepayers to fund expenditures. Thus, for purposes of RSE calculations, it would be appropriate to use a discount rate that reflects the time preferences of investors and ratepayers, including expected inflation, rather than using a pure, societal rate of time preference. For a private firm, the commonly accepted approach to do this is to use the firm's weighted average cost of capital (WACC). (This is the discount rate PG&E used for its RAMP analysis.) For example, if a firm's

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[42] Centers for Disease Control and Prevention, *Economic Burden of Occupational Fatal Injuries in the United States Based on the Census of Fatal Occupational Injuries, 2003-2010* (August 2017)(citing 1996 recommendation from U.S. Department of Health and Human Services Panel on Cost-Effectiveness in Health and Medicine).

[43] For a discussion, see, e.g., Mark Moore and Aidan Vining, "The Social Rate of Time Preference and the Social Discount Rate," Mercatus Symposium, Mercatus Center at George Mason University, Arlington, VA, November 2018. See also, U.S. EPA, "Guidelines for Preparing Economic Analyses," December 2010, Chapter 6.

WACC is 7.0%, then it will generally not pursue investments with a nominal return below 7%, because the investment returns will not even offset the cost to obtain funds.

Sempra does not discount costs in the RSE denominator at all. In its response to TURN Data Request 2-8, Sempra stated, "Because all costs in the GRC are presented in base year dollars to reflect a single year's dollar, without adjustment for escalation, SoCalGas and SDG&E believe that the "comparable measurements" and "present values" language in the Settlement Decision is consistent with the Rate Case Plan's requirement to present all costs in base year, constant dollars." Sempra's statement is incorrect because it fails to adhere to the Settlement's requirement to use present values and fails to recognize the time value of money. Sempra does not discount costs by inflation, but even if Sempra were to use real (inflation-adjusted) dollars, ratepayers and investors still have a time value of money. Sempra's response to TURN-2-8 implies that the company would be indifferent to, say, a ratepayer paying their bill today versus paying their bill in the same inflation-adjusted dollars 10 years from now.

To understand why Sempra's discounting approach biases RSE values upwards, some simple arithmetic helps. Sempra's WACC reflects both its investors' overall rate of time preference and their collective expectations about future inflation. Let the real rate of time preference be **J** and the expected inflation rate be **I.** Then, the WACC = (1 + J) x (1 + I) - 1.

Sempra does no discounting for its cost estimates and uses only the real rate of time preference J to discount risk reduction benefits. Consider a two-year mitigation program that reduces risk by 2,000 units each year and requires spending $1 million inflation-adjusted dollars each year. Sempra's incorrect approach would calculate the RSE as { (2000 / (1.03)) + 2000 / $(1.03)^2$) / $2 million = 3,827 / $2 million = 1,913 per $ million.

Now, suppose inflation is 2.5% and Sempra's WACC is 7.0%. Factoring in inflation, the second year cost of the mitigation program is then $1.025 million. The new RSE value using the corrected approach is:

RSE ={ (2000 / (1.07)) + 2000 / $(1.07)^2$) / ($1 million + $1.025 million/(1.07)) = 3,616 / $1.95 million = 1,847 per $ million.

Thus, by using a 3% discount rate for benefits and not discounting costs, Sempra's RSE values for all programs are biased upwards. For purposes of calculating RSEs, Sempra should be required to use nominal costs for its mitigation programs and discount all costs and risk reduction benefits at its WACC.

3.3. Failure to Disaggregate Wildfire Risk Mitigation Programs for RSE Calculations

If a "program" consists of several different activities, each with its own cost and risk mitigation characteristics, these must be disaggregated to provide for an appropriate RSE

calculation at the level of granularity required by the Settlement. One problematic example is SDG&E's bare conductor replacement program, a wildfire mitigation. SDG&E states its "Distribution Overhead System Hardening program [for bare conductor replacement] combines SDG&E's overhead hardening programs, formerly known as Fire Risk Mitigation (FiRM), Pole Risk Mitigation Engineering (PRiME), and Wire Safety Enhancement (WiSE) into one program."[44] These programs are distinct activities that require individual RSE calculations and should be treated as separate mitigations under the Settlement. While SDG&E does not foresee continuing these programs as currently constituted past 2022,[45] the Sempra Utilities should be urged to calculate individual RSEs for programs with distinct risk mitigation and cost characteristics, including but not limited to bare conductor and pole replacement programs.

4. The Sempra Utilities' Multi-Attribute Value Function (MAVF) Needs to Be Re-Designed to Reflect a More Reasonable Statistical Value of Life

The MAVF is the foundation upon which the consequences of risk events are measured. Unreasonable judgments in framing the MAVF can have a significant impact on the calculations of pre- and post-mitigation risk scores and therefore on the RSE calculations. The Sempra Utilities' MAVF is unreasonable in that it reflects a statistical value of life (SVL) that is far higher than is commonly used in such risk analysis.

The statistical value of life (SVL) is a measurement of the value of mitigating the risk of death. Importantly, SVL is not a valuation of any individual life. Instead, it is a measure of how much society is willing to pay for marginal reductions in the risk of dying across a broad population. The SVL is implied in the MAVF and is found by comparing the ranges (in natural units) and the weights of the Safety and Financial Consequences attributes. The weight of an attribute measures the relative value of changing the level of the attribute from the best level in the range to the worst level in the range.

For Sempra's MAVF, the implied SVL is $100 million. This is because the weight of the Safety attribute is 0.60, the weight of the Financial Consequences attribute is 0.15, and the ranges are from 0 to 20 fatalities and from $0 to $500 million, respectively. Hence, 20 fatalities have the same weight as four times $500 million or $2 billion, which implies that the SVL is

[44] SDG&E RAMP, p. 1-41.

[45] SDG&E RAMP, p. 1-43.

$100 million per fatality. In contrast, the accepted value used by federal agencies for safety policy analysis is approximately $10 million.[46]

Sempra's valuation means that it expects society to value a 1% reduction in the likelihood of occurrence of a single fatality at $1 million. In other words, a mitigation that accomplished this and nothing else each year is worth an expenditure of $1 million per year. This is an order of magnitude greater than the values used by U.S. government agencies for many years to weigh environmental and safety regulations that reduce risk.

To comport with accepted values used by federal agencies in risk analysis, the SVL should be reduced to $10 million. The simplest way to do this is to increase the upper limit of the range of the Safety attribute to 200, keeping the weight at 0.60. The main consequence of not reducing the SVL is that both the risk reduction and RSE are biased upward for mitigations that affect safety.

5. The Sempra Utilities Failed to Provide a Complete Report and to Satisfy the Transparency Requirements of the Settlement

5.1. Settlement Requirements

Row 29 of the Settlement sets forth the transparency requirements that must be met in RAMP and GRC filings. They include:

- Inputs and computations should be clearly stated and defined.
- The sources of inputs should be clearly specified.
- When SME judgment is used, the process that the SMEs undertook to provide their judgment should be described.
- All information and assumptions that are used to determine both pre- and post-mitigation risk scores must be specified.

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[46] The most recent values used by the U.S. EPA and U.S. Dept. of Transportation, which are based on studies from the academic literature, can be found in the following documents: U.S. EPA, "What Value of a Statistical Life Does EPA Use." The EPA uses a value of $7.4 million in 2006$, which is approximately $10 million in 2020$. See also, U.S. Dept. of Transportation, "2016 Revised Value of a Statistical Life Guide," August 8, 2016. The DOT uses a value of $9.6 million in 2016$, also equivalent to about $10 million in 2020$. The DOT also estimates the value of a severe injury at 26.6% of the SVL, or about $2.5 million.

- The mathematical structure of the methodologies used by the utility should be transparent and all algorithms should be identified.
- All calculations should be repeatable by third parties using utility data and assumptions.

These are requirements that must be met by the RAMP submission. Nothing in the Settlement offers any basis for concluding that a utility is free to delay meeting these informational requirements until weeks or months after the RAMP submission. The evident purpose of these requirements is to ensure that the analysis and computations in the RAMP are well-supported and can be understood by SPD and the parties. RAMPs are accelerated proceedings in which the bulk of the work needs to be concluded in 6-7 months. An interpretation that would make compliance with these requirements subject to utility discretion as to when they must be met renders the requirements meaningless in serving the purpose of supporting the conclusions and calculations in the RAMP report and facilitating review and analysis by SPD and the parties.

5.2. The Egregious Insufficiency of the Supporting Information

The only workpapers that the Sempra Utilities provided with their RAMP submissions are posted on their CPUC Proceedings webpage for this case under the heading "workpapers." Those workpapers do not come close to meeting the requirements detailed above, including failing to provide such basic information as the inputs for the pre-mitigation risk scores and the sources of those inputs and the inputs and sources for values that are critical to determining risk reduction and RSEs, including % change in LoRE. And because these are PDF workpapers, they do not indicate the formulas that were used for computations.

It is no exaggeration to state that the inadequacy of these workpapers forced TURN to devote most of its time and resources in this case – through workshops and data requests -- to obtaining the information that is required by Row 29. Key "supplemental" workpapers were not provided until July 9, 2021, almost two months after the Sempra Utilities were supposed to provide complete submissions. While those workpapers were an improvement, they still did not provide much of the required supporting information. As just one of many examples, SCG's supplemental workpapers for its gas risks still offered no explanation of the definition of % Mitigation Scope, % Risk Addressed and % Effectiveness (discussed above in section 3.1). Nor were any of the inputs for those values or the sources of those inputs provided. As a result, TURN was required to devote significant workshop time and data requests (e.g., TURN DR sets 8 and 10) to obtaining this information that should have been provided on May 17, 2021.

As TURN prepared for the workshops for each of the risks covered by workshops, TURN found numerous information gaps, inconsistencies, and errors in the supporting information, which consumed significant amounts of time that could have been devoted to more productive uses. For example, in the workshop discussion regarding SDG&E's Electric Infrastructure Integrity (EII) risk, TURN's questions revealed that SDG&E's workpapers were misrepresenting that all of the risk reduction from certain mitigations was coming from reductions in LoRE,

when, in fact, SDG&E was claiming some risk reduction from impacts on CoRE. To TURN's knowledge, SDG&E still has not corrected its EII workpapers to correctly show how CoRE impacts contribute to risk reduction.

Moreover, to TURN's enduring surprise, the Sempra Utilities have refused to post the additional Excel workpapers they have produced in discovery on their website, even though their website is the only publicly available repository of RAMP documents available to the Commission and the parties. As a result, there is no clear record of what workpapers have been produced and when, which has created problems for the preparation of these comments and the citation of the correct workpapers for the benefit of SPD and other parties. Sempra clearly has the capability to post Excel files on its website, as it has done so with its 2021 Wildfire Mitigation Plan. Rather than aid the parties and the process in this way, Sempra has insisted that TURN must file a motion to get a Commission ruling requiring it to post these workpapers on its website.

The Commission should not allow this experience to be repeated, by the Sempra Utilities or by any of the other utilities who are watching this proceeding to see whether the Commission intends to hold utilities to the requirements it adopted in D.18-12-014. Beginning with SPD's report on this RAMP, the Commission must make clear that utilities are required to provide all of the supporting information required by the Settlement with their RAMP submissions on the due date for those submissions. In addition, Sempra must be required to provide complete and updated workpapers compliant with Row 29 as part of its GRC filing in May 2022. Finally, the Sempra Utilities should be required to post any workpapers they provide to any party on their CPUC proceeding website.

5.3. Transparency Problems Related to the WiNGS Model

Because of the importance of the wildfire risk, special mention needs to be made of transparency problems with SDG&E's primary wildfire risk prioritization model (WiNGS).

First, the model was not presented in SDG&E's RAMP filing or associated workpapers and was only provided to TURN via data request.[47] The model is fundamental to SDG&E's analysis of wildfire risk. It should have been included with the RAMP submission and should be presented as part of SDG&E's filing in its upcoming GRC.

Second, critical components of the model are completely opaque, including calculations to derive wildfire risk, PSPS risk, and mitigation effectiveness values for each segment of the analysis.[48] TURN only ascertained in general how these values are derived through verbal

[47] TURN DR 5, Question 1; TURN DR 6, question 1, and supplemental responses.

[48] TURN DR 6, Question 1, Excel attachment.

responses to questions at a wildfire workshop.[49] SDG&E's GRC filing should provide these critical calculations, along with a narrative explanation of how segment-level results are derived and calculated.

Last but perhaps most significant for the purposes of this proceeding, SDG&E refused to provide the entire model to TURN when TURN requested it.[50] Rather, SDG&E only provided the portion of the model with scoped undergrounding or covered conductor work for 2023-2024, representing 688 of the 3,500 overhead miles SDG&E has analyzed in its WINGS analysis.[51] SDG&E's basis for not providing the model results was that these do not fall "within the scope of SDG&E's 2021 RAMP."[52] TURN chose not to pursue this matter further due to the time constraints of this proceeding.

This illustrates again SDG&E's tendency towards unnecessarily litigious positions in a proceeding where the primary purpose is to provide for the sharing of critical information with significant safety implications. Because the WINGS model provided to stakeholders was not complete, it is not possible to analyze wildfire risk for SDG&E's entire HFTD including how much risk relative to the entire territory is mitigated by SDG&E's forecasted mitigations, nor how much risk prior to the test year is expected to be reduced. While TURN agrees the latter is an important issue in the GRC, it is certainly not "out of scope" in the RAMP, and would have helped TURN and the Commission highlight any potential issues in advance of the utility's GRC filing.

SPD should recommend that SDG&E provide its full WINGS model results for its HFTD (and non-HFTD, if applicable) when it files its GRC, as well as in subsequent RAMP filings. SDG&E should also provide materials such as explanations and data sources, as well as underlying calculations, that demonstrate how key WINGS model outputs are derived, including but not limited to wildfire risk, PSPS risk, and mitigation effectiveness values.

6. Conclusion

TURN appreciates the opportunity to submit these informal comments. For the reasons set forth in these comments, TURN urges SPD to include the recommendations listed in the Appendix - Summary of Recommendations in its November 5, 2021 Report.

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[49] Virtual workshop on wildfire risk held on 9/2/21.

[50] TURN DR 9, Question 1.

[51] TURN DR 6, Question 1, Excel attachment; TURN DR 9, Question 1.

[52] TURN DR 9, Question 1.

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Appendix – Summary of Recommendations

TURN recommends that SPD's November 5, 2021 report include the following findings and recommendations:

1. The Sempra Utilities have failed to comply with the baseline requirement for calculating pre-mitigation risk scores in the SMAP Settlement (Rows 10 and 11), The Settlement requires the Sempra Utilities to use the end of 2023 as the baseline for their pre-mitigation risk scores. To comply with the Settlement, the Sempra Utilities should bring their RSE analysis for their upcoming GRC request into conformity with this requirement.

2. The Sempra Utilities have failed to comply with the Tranche granularity requirements of the Settlement with respect to at least the following risks: Wildfire, Medium Pressure Gas System and High Pressure Gas System. (TURN's time and resource limitations did not allow it to analyze this issue with respect to other risks.) The Sempra Utilities should remedy their non-compliance in their upcoming GRC as follows:

   a. With respect to the Wildfire risk, the Sempra Utilities should use the granular information from the WiNGS model to create tranches based on circuit segments with homogenous risk profiles that are used to calculate tranche-specific RSEs for all Wildfire mitigation activities.

   b. With respect to the Medium Pressure and High Pressure Gas Risks, the Sempra Utilities should use the detailed operational information in their various databases (DREAMS, Integrity Management, etc.) to create tranches based on groups of assets with homogenous risk profiles. The creation of tranches with the required granularity should avoid the RSE calculation error described in section 4.1.2 of these comments.

   c. The absence of cost tracking systems should not be allowed to serve as a justification for failing to satisfy the Tranche requirements of the Settlement. The Sempra Utilities should accelerate their efforts to enable reliable estimation of tranche-level costs.

   d. As required by Row 14, for every risk, the Sempra Utilities must provide the rationale for their determination of tranches, including the judgment that no tranches are appropriate for a risk event. The Sempra Utilities should provide this explanation in their upcoming GRC submission.

3. The Sempra Utilities should not use the so-called "% % %" method for calculating risk reduction for their gas risks (or any risks). The use of such a method would not be necessary if the Sempra Utilities used tranches with the granularity required by the Settlement.

4. The Sempra Utilities' practices regarding discounting (or lack thereof) of the numerator and denominator of the RSE calculation fail to comply with Row 25 of the Settlement. For purposes of calculating RSEs, Sempra should be required to use nominal costs for its mitigation programs and discount all costs and risk reduction benefits at its weighted average cost of capital.

5. For all risks, the Sempra Utilities should calculate individual RSEs for programs with distinct risk mitigation and cost characteristics, including but not limited to bare conductor and pole replacement programs.

6. The structure of the Sempra Utilities' MAVF reflects a statistical value of life (SVL) that is an order of magnitude higher than the SVL used by federal agencies for risk analysis, which biases the risk scores and RSE values upwards. To comport with accepted values for the SVL, the upper limit of the range of the Safety attribute should be increased to 200, keeping the weight at 0.60.

7. The Sempra Utilities' RAMP submissions failed to comply with the transparency requirements of Row 29 of the Settlement. SPD's report should make clear that utilities are required to provide all of the supporting information required by the Settlement with their RAMP submissions on the due date for those submissions. In addition, the Sempra Utilities should be required to provide complete and updated workpapers compliant with Row 29 as part of their GRC filing in May 2022. Finally, the Sempra Utilities should be required to post any workpapers they provide to any party on their CPUC proceeding website.

8. SDG&E should provide its full WINGS model results for its HFTD (and non-HFTD, if applicable) when it files its GRC, as well as in subsequent RAMP filings. SDG&E should also provide materials such as explanations and data sources, as well as underlying calculations, that demonstrate how key WINGS model outputs are derived, including but not limited to wildfire risk, PSPS risk, and mitigation effectiveness values.

TURN provided extensive comments to the Safety Policy Division regarding the importance of sufficiently granular tranches, the problems with interpreting RSE and B-C ratio results from insufficiently granular tranches, and the insufficiency of Sempra's tranches for three key risks: Wildfire, Medium Pressure Gas System, and High Pressure Gas System.[49] We will not repeat those points here, but rather include those comments in Appendix F to this testimony. The minor changes Sempra made to its RAMP tranches in this GRC[50] for the Wildfire, Medium Pressure Gas, and High Pressure Gas risks fall far short of addressing the concerns TURN presented in those comments, and, more importantly, do not meet the standards of the settlement.

To the extent that Sempra's tranches are insufficiently granular, the Commission should recognize that the results we provide in Appendix D mask differences in the cost effectiveness values that would provide more useful information for the Commission in targeting ratepayer funding to the most cost-effective activities.

Q. Are you making any funding recommendations based on these results?

A. Not in this testimony. However, certain TURN witnesses refer to the results in Appendix D when presenting their analysis and funding recommendations.

Q. Does this conclude your testimony?

A. Yes.

[49] Informal Comments of TURN to the Safety Policy Division on the Sempra Utilities' RAMP Report, A.21-05-011, Oct. 22, 2021, Section 2 and subsections, pp. 3-20 (attached to this testimony as Appendix F).

[50] Ex. SCG-SDG&E-03-2R, Chap. 2, p. RSP/GSF-10.